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ORGANIC ELECTROLUMINESCENT MATERIALS AND DEVICES

Abstract

A compound having a first ligand L.sub.A comprising a structure of Formula I,
##STR00001##
is provided. In Formula I, at least one of the following statements is true: (1) R.sup.C comprises at least one silyl or germyl group; or (2) R.sup.C is Formula II
##STR00002##
with the proviso that Y.sup.2 and R.sup.B are not joined to form a ring; and if moiety D is phenyl, then at least one R.sup.D comprises one chemical group selected from the group consisting of: deuterium, halogen, alkyl having five or more carbon atoms, cycloalkyl, heteroalkyl, heterocycloalkyl, arylalkyl, alkoxy, aryloxy, amino, silyl, germyl, boryl, alkenyl, cycloalkenyl, heteroalkenyl, alkynyl, aryl, heteroaryl, acyl, carboxylic acid, ether, ester, nitrile, isonitrile, sulfanyl, sulfinyl, sulfonyl, phosphino, boryl, selenyl, and combinations thereof. Formulations, OLEDs, and consumer products containing the compound are also provided.

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Background/Summary

CROSS-REFERENCE TO RELATED APPLICATIONS [0001] This application claims priority under 35 U.S.C. § 119 (e) to U.S. Provisional Application No. 63/556,224, filed on Feb. 21, 2024, the entire contents of which are incorporated herein by reference.

FIELD
[0002] The present disclosure generally relates to organic or metal coordination compounds and formulations and their various uses including as emitters, sensitizers, charge transporters, or exciton transporters in devices such as organic light emitting diodes and related electronic devices and consumer products.
BACKGROUND
[0003] Opto-electronic devices that make use of organic materials are becoming increasingly desirable for various reasons. Many of the materials used to make such devices are relatively inexpensive, so organic opto-electronic devices have the potential for cost advantages over inorganic devices. In addition, the inherent properties of organic materials, such as their flexibility, may make them well suited for particular applications such as fabrication on a flexible substrate. Examples of organic opto-electronic devices include organic light emitting diodes/devices (OLEDs), organic phototransistors, organic photovoltaic cells, organic scintillators, and organic photodetectors. For OLEDs, the organic materials may have performance advantages over conventional materials.
[0004] OLEDs make use of thin organic films that emit light when voltage is applied across the device. OLEDs are becoming an increasingly interesting technology for use in applications such as displays, illumination, and backlighting.
[0005] One application for emissive molecules is a full color display. Industry standards for such a display call for pixels adapted to emit particular colors, referred to as “saturated” colors. In particular, these standards call for saturated red, green, and blue pixels. Alternatively, the OLED can be designed to emit white light. In conventional liquid crystal displays emission from a white backlight is filtered using absorption filters to produce red, green and blue emission. The same technique can also be used with OLEDs. The white OLED can be either a single emissive layer (EML) device or a stack structure. Color may be measured using CIE coordinates, which are well known to the art.
SUMMARY
[0006] In one aspect, the present disclosure provides a compound having a first ligand L.sub.A comprising a structure of Formula I:
##STR00003##
wherein: [0007] at least one of the following statements is true: [0008] (1) R.sup.C comprises at least one silyl or germyl group; [0009] (2) R.sup.C is Formula II:
##STR00004## [0010] each of moiety B and moiety D is independently a monocyclic ring or a polycyclic fused ring system, wherein the monocyclic ring or each ring of the polycyclic fused ring system is independently a 5-membered to 10-membered carbocyclic or heterocyclic ring; [0011]

each of X.sup.1 to X.sup.5 is independently C or N; [0012] Y.sup.1 and Y.sup.2 are each independently selected from the group consisting of BR, BRR′, NR, PR, P(O)R, O, S, Se, C═O, C═S, C═Se, C═NR′, C═CRR′, S═O, SO.sub.2, CR, CRR′, SiRR′, and GeRR′; [0013] K is selected from the group consisting of a direct bond, O, S, N(R.sup.α), P(R.sup.α), B(R), C(R.sup.α)(R.sup.β), and Si(R.sup.α)(R.sup.β); [0014] each of R.sup.A, R.sup.B, and R.sup.D each independently represents mono to the maximum allowable substitution, or no substitution; [0015] each R, R′, R.sup.α, R.sup.β, R.sup.A, R.sup.B, and R.sup.D is independently hydrogen or a substituent selected from the group consisting of deuterium, halogen, alkyl, cycloalkyl, heteroalkyl, heterocycloalkyl, boryl, arylalkyl, alkoxy, aryloxy, amino, silyl, germyl, alkenyl, cycloalkenyl, heteroalkenyl, alkynyl, aryl, heteroaryl, acyl, carboxylic acid, ether, ester, nitrile, isonitrile, sulfanyl, sulfinyl, sulfonyl, phosphino, selenyl, and combinations thereof; [0016] R.sup.C is a substituent selected from the group consisting of alkyl, cycloalkyl, heteroalkyl, heterocycloalkyl, boryl, arylalkyl, alkoxy, aryloxy, amino, silyl, germyl, alkenyl, cycloalkenyl, heteroalkenyl, alkynyl, aryl, heteroaryl, acyl, carboxylic acid, ether, ester, nitrile, isonitrile, sulfanyl, sulfinyl, sulfonyl, phosphino, selenyl, partially or fully deuterated variants thereof, partially or fully halogenated variants thereof, and combinations thereof; [0017] L.sub.A is coordinated to a metal M through the indicated dashed lines; [0018] M has an atomic mass of at least 40; [0019] M can be coordinated to other ligands; [0020] L.sub.A can be joined with other ligands to comprise a tridentate, tetradentate, pentadentate, or hexadentate ligand; and any two substituents may be joined or fused to form a ring.

[0021] In another aspect, the present disclosure provides a formulation comprising a compound having a first ligand L.sub.A comprising a structure of Formula I as described herein.

[0022] In yet another aspect, the present disclosure provides an OLED having an organic layer comprising a compound having a first ligand L.sub.A comprising a structure of Formula I as described herein.

[0023] In yet another aspect, the present disclosure provides a consumer product comprising an OLED with an organic layer comprising a compound having a first ligand L.sub.A comprising a structure of Formula I as described herein.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

[0024] FIG. **1** shows an organic light emitting device.

[0025] FIG. **2** shows an inverted organic light emitting device that does not have a separate electron transport layer.

DETAILED DESCRIPTION

A. Terminology

[0026] Unless otherwise specified, the below terms used herein are defined as follows:

[0027] As used herein, “top” means furthest away from the substrate, while “bottom” means closest to the substrate. Where a first layer is described as “disposed over” a second layer, the first layer is disposed further away from substrate. There may be other layers between the first and second layer, unless it is specified that the first layer is “in contact with” the second layer. For example, a cathode may be described as “disposed over” an anode, even though there are various organic layers in between.

[0028] As used herein, “solution processable” means capable of being dissolved, dispersed, or transported in and/or deposited from a liquid medium, either in solution or suspension form.

[0029] As used herein, and as would be generally understood by one skilled in the art, a first “Highest Occupied Molecular Orbital” (HOMO) or “Lowest Unoccupied Molecular Orbital” (LUMO) energy level is “greater than” or “higher than” a second HOMO or LUMO energy level if

the first energy level is closer to the vacuum energy level. Since ionization potentials (IP) are measured as a negative energy relative to a vacuum level, a higher HOMO energy level corresponds to an IP having a smaller absolute value (an IP that is less negative). Similarly, a higher LUMO energy level corresponds to an electron affinity (EA) having a smaller absolute value (an EA that is less negative). On a conventional energy level diagram, with the vacuum level at the top, the LUMO energy level of a material is higher than the HOMO energy level of the same material. A “higher” HOMO or LUMO energy level appears closer to the top of such a diagram than a “lower” HOMO or LUMO energy level.

[0030] As used herein, and as would be generally understood by one skilled in the art, a first work function is “greater than” or “higher than” a second work function if the first work function has a higher absolute value. Because work functions are generally measured as negative numbers relative to vacuum level, this means that a “higher” work function is more negative. On a conventional energy level diagram, with the vacuum level at the top, a “higher” work function is illustrated as further away from the vacuum level in the downward direction. Thus, the definitions of HOMO and LUMO energy levels follow a different convention than work functions.

[0031] Layers, materials, regions, and devices may be described herein in reference to the color of light they emit. In general, as used herein, an emissive region that is described as producing a specific color of light may include one or more emissive layers disposed over each other in a stack.

[0032] As used herein, a “NIR”, “red”, “green”, “blue”, “yellow” layer, material, region, or device refers to a layer, a material, a region, or a device that emits light in the wavelength range of about 700-1500 nm, 580-700 nm, 500-600 nm, 400-500 nm, 540-600 nm, respectively, or a layer, a material, a region, or a device that has a highest peak in its emission spectrum in the respective wavelength region. In some arrangements, separate regions, layers, materials, or devices may provide separate “deep blue” and “light blue” emissions. As used herein, the “deep blue” emission component refers to an emission having a peak emission wavelength that is at least about 4 nm less than the peak emission wavelength of the “light blue” emission component. Typically, a “light blue” emission component has a peak emission wavelength in the range of about 465-500 nm, and a “deep blue” emission component has a peak emission wavelength in the range of about 400-470 nm, though these ranges may vary for some configurations.

[0033] In some arrangements, a color altering layer that converts, modifies, or shifts the color of the light emitted by another layer to an emission having a different wavelength is provided. Such a color altering layer can be formulated to shift wavelength of the light emitted by the other layer by a defined amount, as measured by the difference in the wavelength of the emitted light and the wavelength of the resulting light. In general, there are two classes of color altering layers: color filters that modify a spectrum by removing light of unwanted wavelengths, and color changing layers that convert photons of higher energy to lower energy. For example, a “red” color filter can be present in order to filter an input light to remove light having a wavelength outside the range of about 580-700 nm. A component “of a color” refers to a component that, when activated or used, produces or otherwise emits light having a particular color as previously described. For example, a “first emissive region of a first color” and a “second emissive region of a second color different than the first color” describes two emissive regions that, when activated within a device, emit two different colors as previously described.

[0034] As used herein, emissive materials, layers, and regions may be distinguished from one another and from other structures based upon light initially generated by the material, layer or region, as opposed to light eventually emitted by the same or a different structure. The initial light generation typically is the result of an energy level change resulting in emission of a photon. For example, an organic emissive material may initially generate blue light, which may be converted by a color filter, quantum dot or other structure to red or green light, such that a complete emissive stack or sub-pixel emits the red or green light. In this case the initial emissive material, region, or layer may be referred to as a “blue” component, even though the sub-pixel is a “red” or “green”

component.
[0035] In some cases, it may be preferable to describe the color of a component such as an emissive region, sub-pixel, color altering layer, or the like, in terms of 1931 CIE coordinates. For example, a yellow emissive material may have multiple peak emission wavelengths, one in or near an edge of the “green” region, and one within or near an edge of the “red” region as previously described. Accordingly, as used herein, each color term also corresponds to a shape in the 1931 CIE coordinate color space. The shape in 1931 CIE color space is constructed by following the locus between two color points and any additional interior points. For example, interior shape parameters for red, green, blue, and yellow may be defined as shown below:
TABLE-US-00001 Color CIE Shape Parameters Central Red Locus: [0.6270, 0.3725]; [0.7347, 0.2653]; Interior: [0.5086, 0.2657] Central Green Locus: [0.0326, 0.3530]; [0.3731, 0.6245]; Interior: [0.2268, 0.3321 Central Blue Locus: [0.1746, 0.0052]; [0.0326, 0.3530]; Interior: [0.2268, 0.3321] Central Yellow Locus: [0.3731, 0.6245]; [0.6270, 0.3725]; Interior: [0.3700, 0.4087]; [0.2886, 0.4572]
[0036] The terms “halo,” “halogen,” and “halide” are used interchangeably and refer to fluorine, chlorine, bromine, and iodine.
[0037] The term “acyl” refers to a substituted carbonyl group (—C(O)—R.sub.s).
[0038] The term “ester” refers to a substituted oxycarbonyl (—O—C(O)—R.sub.s or —C(O)—O —R.sub.s) group.
[0039] The term “ether” refers to an —OR.sub.s group.
[0040] The terms “sulfanyl” or “thio-ether” are used interchangeably and refer to a —SR.sub.s group.
[0041] The term “selenyl” refers to a —SeR.sub.s group.
[0042] The term “sulfinyl” refers to a —S(O)—R.sub.s group.
[0043] The term “sulfonyl” refers to a —SO.sub.2—R.sub.s group.
[0044] The term “phosphino” refers to a group containing at least one phosphorus atom bonded to the relevant structure. Common examples of phosphino groups include, but are not limited to, groups such as a —P(R.sub.s).sub.2 group or a —PO(R.sub.s).sub.2 group, wherein each R.sub.s can be same or different.
[0045] The term “silyl” refers to a group containing at least one silicon atom bonded to the relevant structure. Common examples of silyl groups include, but are not limited to, groups such as a —Si(R.sub.s).sub.3 group, wherein each R.sub.s can be same or different. The term “germyl” refers to a group containing at least one germanium atom bonded to the relevant structure. Common examples of germyl groups include, but are not limited to, groups such as a —Ge(R.sub.s).sub.3 group, wherein each R.sub.s can be same or different.
[0046] The term “boryl” refers to a group containing at least one boron atom bonded to the relevant structure. Common examples of boryl groups include, but are not limited to, groups such as a —B(R.sub.s).sub.2 group or its Lewis adduct —B(R.sub.s).sub.3 group, wherein R.sub.s can be same or different.
[0047] In each of the above, R.sub.s can be hydrogen or a substituent selected from the group consisting of the general substituents as defined in this application. Preferred R.sub.s is selected from the group consisting of deuterium, halogen, alkyl, cycloalkyl, heteroalkyl, heterocycloalkyl, arylalkyl, alkoxy, aryloxy, amino, silyl, alkenyl, cycloalkenyl, heteroalkenyl, alkynyl, aryl, heteroaryl, and combination thereof. More preferably R.sub.s is selected from the group consisting of alkyl, cycloalkyl, aryl, heteroaryl, and combination thereof.
[0048] The term “alkyl” refers to and includes both straight and branched chain alkyl groups having an alkyl carbon atom bonded to the relevant structure. Preferred alkyl groups are those containing from one to fifteen carbon atoms, preferably one to nine carbon atoms, and the preferred alkyl groups include methyl, ethyl, n-propyl, iso-propyl, n-butyl, sec-butyl, iso-butyl, tert-butyl, n-pentyl, 2-methylbutyl, 3-methylbutyl, 2,2-dimethylpropyl, 1,3-dimethylpropyl, 1,1-dimethylpropyl,

2-ethylpropyl, 1,2-dimethylpropyl, n-hexyl, 2-methylpentyl, 3-methylpentyl, 2,2-dimethylbutyl, 2,3-dimethylbutyl, n-heptyl, 2-methylhexyl, 3-methylhexyl, 2,2-dimethylpentyl, 2,3-dimethylpentyl, 2,4-dimethylpentyl, 3,3-dimethylpentyl, 3-ethylpentyl, 2,2,3-trimethylbutyl, and the like. Additionally, the alkyl group can be further substituted.

[0049] The term "cycloalkyl" refers to and includes monocyclic, polycyclic, and spiro alkyl groups having a ring alkyl carbon atom bonded to the relevant structure. Preferred cycloalkyl groups are those containing 3 to 12 ring carbon atoms and includes cyclopropyl, cyclopentyl, cyclohexyl, bicyclo[3.1.1]heptyl, spiro[4.5]decyl, spiro[5.5]undecyl, adamantyl, and the like. Additionally, the cycloalkyl group can be further substituted.

[0050] The terms "heteroalkyl" or "heterocycloalkyl" refer to an alkyl or a cycloalkyl group, respectively, having at least one carbon atom replaced by a heteroatom. Optionally the at least one heteroatom is selected from O, S, N, P, B, Si, Ge and Se, preferably, O, S or N. Additionally, the heteroalkyl or heterocycloalkyl group can be further substituted.

[0051] The term "alkenyl" refers to and includes both straight and branched chain alkene groups. Alkenyl groups are essentially alkyl groups that include at least one carbon-carbon double bond in the alkyl chain with one carbon atom from the carbon-carbon double bond that is bonded to the relevant structure. Cycloalkenyl groups are essentially cycloalkyl groups that include at least one carbon-carbon double bond in the cycloalkyl ring. The term "heteroalkenyl" as used herein refers to an alkenyl group having at least one carbon atom replaced by a heteroatom. Optionally the at least one heteroatom is selected from O, S, N, P, B, Si, Ge, and Se, preferably, O, S, or N. Preferred alkenyl, cycloalkenyl, or heteroalkenyl groups are those containing two to fifteen carbon atoms. Additionally, the alkenyl, cycloalkenyl, or heteroalkenyl group can be further substituted.

[0052] The term "alkynyl" refers to and includes both straight and branched chain alkyne groups. Alkynyl groups are essentially alkyl groups that include at least one carbon-carbon triple bond in the alkyl chain with one carbon atom from the carbon-carbon triple bond that is bonded to the relevant structure. Preferred alkynyl groups are those containing two to fifteen carbon atoms. Additionally, the alkynyl group can be further substituted.

[0053] The terms "aralkyl" or "arylalkyl" are used interchangeably and refer to an aryl-substituted alkyl group having an alkyl carbon atom bonded to the relevant structure. Additionally, the aralkyl group can be further substituted.

[0054] The term "heterocyclic group" refers to and includes aromatic and non-aromatic cyclic groups containing at least one heteroatom. Optionally the at least one heteroatom is selected from O, S, Se, N, P, B, Si, Ge, and Se, preferably, O, S, N, or B. Hetero-aromatic cyclic groups may be used interchangeably with heteroaryl. Preferred hetero-non-aromatic cyclic groups are those containing 3 to 10 ring atoms, preferably those containing 3 to 7 ring atoms, which includes at least one hetero atom, and includes cyclic amines such as morpholino, piperidino, pyrrolidino, and the like, and cyclic ethers/thio-ethers, such as tetrahydrofuran, tetrahydropyran, tetrahydrothiophene, and the like. Additionally, the heterocyclic group can be further substituted or fused.

[0055] The term "aryl" refers to and includes both single-ring and polycyclic aromatic hydrocarbyl groups. The polycyclic rings may have two or more rings in which two carbons are common to two adjoining rings (the rings are "fused"). Preferred aryl groups are those containing six to thirty carbon atoms, preferably six to twenty-four carbon atoms, six to eighteen carbon atoms, and more preferably six to twelve carbon atoms. Especially preferred is an aryl group having six carbons, ten carbons, twelve carbons, fourteen carbons, or eighteen carbons. Suitable aryl groups include phenyl, biphenyl, triphenyl, triphenylene, tetraphenylene, naphthalene, anthracene, phenalene, phenanthrene, pyrene, chrysene, perylene, and azulene, preferably phenyl, biphenyl, triphenyl, triphenylene, and naphthalene. Additionally, the aryl group can be further substituted or fused, such as, without limitation, fluorene.

[0056] The term "heteroaryl" refers to and includes both single-ring aromatic groups and polycyclic aromatic ring systems that include at least one heteroatom. The heteroatoms include, but

are not limited to O, S, Se, N, P, B, Si, Ge, and Se. In many instances, O, S, N, or B are the preferred heteroatoms. Hetero-single ring aromatic systems are preferably single rings with 5 or 6 ring atoms, and the ring can have from one to six heteroatoms. The hetero-polycyclic ring systems can have two or more aromatic rings in which two atoms are common to two adjoining rings (the rings are “fused”) wherein at least one of the rings is a heteroaryl. The hetero-polycyclic aromatic ring systems can have from one to six heteroatoms per ring of the polycyclic aromatic ring system. Preferred heteroaryl groups are those containing three to thirty carbon atoms, preferably three to twenty-four carbon atoms, three to eighteen carbon atoms, and more preferably three to twelve carbon atoms. Suitable heteroaryl groups include dibenzothiophene, dibenzofuran, dibenzoselenophene, furan, thiophene, benzofuran, benzothiophene, benzoselenophene, carbazole, indolocarbazole, pyridylindole, pyrrolodipyridine, pyrazole, imidazole, triazole, oxazole, thiazole, oxadiazole, oxatriazole, dioxazole, thiadiazole, pyridine, pyridazine, pyrimidine, pyrazine, triazine, oxazine, oxathiazine, oxadiazine, indole, benzimidazole, indazole, indoxazine, benzoxazole, benzisoxazole, benzothiazole, quinoline, isoquinoline, cinnoline, quinazoline, quinoxaline, naphthyridine, phthalazine, pteridine, xanthene, acridine, phenazine, phenothiazine, phenoxazine, benzofuropyridine, furodipyridine, benzothienopyridine, thienodipyridine, benzoselenophenopyridine, selenophenodipyridine, azaborine, borazine, 522,9% 2-diaza-13b-boranaphtho[2,3,4-de]anthracene, 5% 2-benzo[d]benzo[4,5]imidazo[3,2-a]imidazole, and 5,9-dioxa-13b-boranaphtho[3,2,1-de]anthracene; preferably dibenzothiophene, dibenzofuran, dibenzoselenophene, carbazole, indolocarbazole, imidazole, pyridine, triazine, benzimidazole, 522,9% 2-diaza-13b-boranaphtho[2,3,4-de]anthracene, 522-benzo[d]benzo[4,5]imidazo[3,2-a]imidazole, and 5,9-dioxa-13b-boranaphtho[3,2,1-de]anthracene. Additionally, the heteroaryl group can be further substituted or fused.

[0057] Of the aryl and heteroaryl groups listed above, the groups of triphenylene, naphthalene, anthracene, dibenzothiophene, dibenzofuran, dibenzoselenophene, carbazole, indolocarbazole, imidazole, pyridine, pyrazine, pyrimidine, triazine, benzimidazole, 522,922-diaza-13b-boranaphtho[2,3,4-de]anthracene, 522-benzo[d]benzo[4,5]imidazo[3,2-a]imidazole, 5,9-dioxa-13b-boranaphtho[3,2,1-de]anthracene, and the respective aza-analogs of each thereof are of particular interest.

[0058] In many instances, the General Substituents are selected from the group consisting of deuterium, halogen, alkyl, cycloalkyl, heteroalkyl, heterocycloalkyl, arylalkyl, alkoxy, aryloxy, amino, silyl, germyl, boryl, alkenyl, cycloalkenyl, heteroalkenyl, alkynyl, aryl, heteroaryl, acyl, carboxylic acid, ether, ester, nitrile, isonitrile, sulfanyl, selenyl, sulfinyl, sulfonyl, phosphino, and combinations thereof.

[0059] In some instances, the Preferred General Substituents are selected from the group consisting of deuterium, fluorine, alkyl, cycloalkyl, heteroalkyl, alkoxy, aryloxy, amino, silyl, germyl, boryl, alkenyl, cycloalkenyl, heteroalkenyl, aryl, heteroaryl, nitrile, isonitrile, sulfanyl, and combinations thereof.

[0060] In some instances, the More Preferred General Substituents are selected from the group consisting of deuterium, fluorine, alkyl, cycloalkyl, alkoxy, aryloxy, amino, silyl, germyl, boryl, aryl, heteroaryl, nitrile, sulfanyl, and combinations thereof.

[0061] In some instances, the Even More Preferred General Substituents are selected from the group consisting of deuterium, fluorine, alkyl, cycloalkyl, silyl, aryl, heteroaryl, nitrile, and combinations thereof.

[0062] In yet other instances, the Most Preferred General Substituents are selected from the group consisting of deuterium, alkyl, cycloalkyl, aryl, heteroaryl, and combinations thereof.

[0063] The terms “substituted” and “substitution” refer to a substituent other than H that is bonded to the relevant position, e.g., a carbon or nitrogen. For example, when R.sup.1 represents mono-substitution, then one R.sup.1 must be other than H (i.e., a substitution). Similarly, when R.sup.1 represents di-substitution, then two of R.sup.1 must be other than H. Similarly, when R.sup.1

represents zero or no substitution, R.sup.1, for example, can be a hydrogen for all available valencies of ring atoms, as in carbon atoms for benzene and the nitrogen atom in pyrrole, or simply represents nothing for ring atoms with fully filled valencies, e.g., the nitrogen atom in pyridine. The maximum number of substitutions possible in a ring structure will depend on the total number of available valencies in the ring atoms.

[0064] As used herein, "combinations thereof" indicates that one or more members of the applicable list are combined to form a known or chemically stable arrangement that one of ordinary skill in the art can envision from the applicable list. For example, an alkyl and deuterium can be combined to form a partial or fully deuterated alkyl group; a halogen and alkyl can be combined to form a halogenated alkyl substituent; and a halogen, alkyl, and aryl can be combined to form a halogenated arylalkyl. In one instance, the term substitution includes a combination of two to four of the listed groups. In another instance, the term substitution includes a combination of two to three groups. In yet another instance, the term substitution includes a combination of two groups. Preferred combinations of substituent groups are those that contain up to fifty atoms that are not hydrogen or deuterium, or those which include up to forty atoms that are not hydrogen or deuterium, or those that include up to thirty atoms that are not hydrogen or deuterium. In many instances, a preferred combination of substituent groups will include up to twenty atoms that are not hydrogen or deuterium.

[0065] The "aza" designation in the fragments described herein, i.e. aza-dibenzofuran, aza-dibenzothiophene, etc. means that one or more of the C—H groups in the respective aromatic ring can be replaced by a nitrogen atom, for example, and without any limitation, azatriphenylene encompasses both dibenzo[f,h]quinoxaline and dibenzo[f,h]quinoline. One of ordinary skill in the art can readily envision other nitrogen analogs of the aza-derivatives described above, and all such analogs are intended to be encompassed by the terms as set forth herein.

[0066] As used herein, "deuterium" refers to an isotope of hydrogen. Deuterated compounds can be readily prepared using methods known in the art. For example, U.S. Pat. No. 8,557,400, Patent Pub. No. WO 2006/095951, and U.S. Pat. Application Pub. No. US 2011/0037057, which are hereby incorporated by reference in their entireties, describe the making of deuterium-substituted organometallic complexes. Further reference is made to Ming Yan, et al., *Tetrahedron* 2015, 71, 1425-30 and Atzrodt et al., Angew. *Chem. Int. Ed*. (Reviews)2007, 46, 7744-65, which are incorporated by reference in their entireties, describe the deuteration of the methylene hydrogens in benzyl amines and efficient pathways to replace aromatic ring hydrogens with deuterium, respectively.

[0067] As used herein, any specifically listed substituent, such as, without limitation, methyl, phenyl, pyridyl, etc. includes undeuterated, partially deuterated, and fully deuterated versions thereof. Similarly, classes of substituents such as, without limitation, alkyl, aryl, cycloalkyl, heteroaryl, etc. also include undeuterated, partially deuterated, and fully deuterated versions thereof. Unless otherwise specified, atoms in chemical structures without valences fully filled by H or D should be considered to include undeuterated, partially deuterated, and fully deuterated versions thereof. For example, the chemical structure of

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implies to include C.sub.6H.sub.6, C.sub.6D.sub.6, C.sub.6H.sub.3D.sub.3, and any other partially deuterated variants thereof. Some common basic partially or fully deuterated group include, without limitation, CD.sub.3, CD.sub.2C(CH.sub.3).sub.3, C(CD.sub.3).sub.3, and C.sub.6D.sub.5.

[0068] It is to be understood that when a molecular fragment is described as being a substituent or otherwise attached to another moiety, its name may be written as if it were a fragment (e.g. phenyl, phenylene, naphthyl, dibenzofuryl) or as if it were the whole molecule (e.g. benzene, naphthalene, dibenzofuran). As used herein, these different ways of designating a substituent or attached fragment are considered to be equivalent.

[0069] In some instances, a pair of substituents in the molecule can be optionally joined or fused

into a ring. The preferred ring is a five to nine-membered carbocyclic or heterocyclic ring, includes both instances where the portion of the ring formed by the pair of substituents is saturated and where the portion of the ring formed by the pair of substituents is unsaturated. In yet other instances, a pair of adjacent substituents can be optionally joined or fused into a ring. As used herein, “adjacent” means that the two substituents involved can be on the same ring next to each other, or on two neighboring rings having the two closest available substitutable positions, such as 2,2′ positions in a biphenyl, or 1,8 position in a naphthalene.

B. The Compounds of the Present Disclosure

[0070] In one aspect, the present disclosure provides a compound having a first ligand L.sub.A comprising a structure of Formula I:

##STR00006##

[0071] wherein: [0072] at least one of the following statements is true: [0073] (1) R.sup.C comprises at least one silyl or germyl group; [0074] (2) R.sup.C is Formula II:

##STR00007## [0075] each of moiety B and moiety D is independently a monocyclic ring or a polycyclic fused ring system, wherein the monocyclic ring or each ring of the polycyclic fused ring system is independently a 5-membered to 10-membered carbocyclic or heterocyclic ring; [0076] each of X.sup.1 to X.sup.5 is independently C or N; [0077] Y.sup.1 and Y.sup.2 are each independently selected from the group consisting of BR, BRR′, NR, PR, P(O)R, O, S, Se, C═O, C═S, C═Se, C═NR′, C═CRR′, S═O, SO.sub.2, CR, CRR′, SiRR′, and GeRR′; [0078] K is selected from the group consisting of a direct bond, O, S, N(R.sup.α), P(R.sup.α), B(R.sup.α), C(R.sup.α) (R.sup.β), and Si(R.sup.α) (R.sup.β); [0079] each of R.sup.A, R.sup.B, and R.sup.D each independently represents mono to the maximum allowable substitution, or no substitution; [0080] each R, R′, R.sup.α, R.sup.β, R.sup.A, R.sup.B, and R.sup.D is independently hydrogen or a substituent selected from the group consisting of deuterium, halogen, alkyl, cycloalkyl, heteroalkyl, heterocycloalkyl, boryl, arylalkyl, alkoxy, aryloxy, amino, silyl, germyl, alkenyl, cycloalkenyl, heteroalkenyl, alkynyl, aryl, heteroaryl, acyl, carboxylic acid, ether, ester, nitrile, isonitrile, sulfanyl, sulfinyl, sulfonyl, phosphino, selenyl, and combinations thereof; [0081] R.sup.C is a substituent selected from the group consisting of alkyl, cycloalkyl, heteroalkyl, heterocycloalkyl, boryl, arylalkyl, alkoxy, aryloxy, amino, silyl, germyl, alkenyl, cycloalkenyl, heteroalkenyl, alkynyl, aryl, heteroaryl, acyl, carboxylic acid, ether, ester, nitrile, isonitrile, sulfanyl, sulfinyl, sulfonyl, phosphino, selenyl, partially or fully deuterated variants thereof, partially or fully halogenated variants thereof, and combinations thereof; [0082] L.sub.A is coordinated to a metal M through the indicated dashed lines; [0083] M has an atomic mass of at least 40; [0084] M can be coordinated to other ligands; [0085] L.sub.A can be joined with other ligands to comprise a tridentate, tetradentate, pentadentate, or hexadentate ligand; and any two substituents may be joined or fused to form a ring.

[0086] In some embodiments, Y.sup.2 and R.sup.B are not joined to form a ring.

[0087] In some embodiments, if moiety D is phenyl, then at least one R.sup.D comprises one chemical group selected from the group consisting of: deuterium, halogen, alkyl having five or more carbon atoms, cycloalkyl, heteroalkyl, heterocycloalkyl, arylalkyl, alkoxy, aryloxy, amino, silyl, germyl, boryl, alkenyl, cycloalkenyl, heteroalkenyl, alkynyl, aryl, heteroaryl, acyl, carboxylic acid, ether, ester, nitrile, isonitrile, sulfanyl, sulfinyl, sulfonyl, phosphino, boryl, selenyl, and combinations thereof. In some such embodiments, moiety D is phenyl.

[0088] In some embodiments, L.sub.A consists essentially of Formula I. In some embodiments, L.sub.A has a structure of Formula I.

[0089] In some embodiments of Formula I, at least one R.sup.A, R.sup.B, and R.sup.C is partially or fully deuterated. In some embodiments, at least one R.sup.A is partially or fully deuterated. In some embodiments, at least one R.sup.B is partially or fully deuterated. In some embodiments, at least one R.sup.D is partially or fully deuterated.

[0090] In some embodiments, each R, R′, R.sup.α, R.sup.β, R.sup.A, R.sup.B, and R.sup.D is

independently hydrogen or a substituent selected from the General Preferred Substituents defined herein. In some embodiments, each R, R′, R.sup.α, R.sup.β, R.sup.A, R.sup.B, and R.sup.D is independently hydrogen or a substituent selected from the More Preferred Substituents defined herein. In some embodiments, each R, R′, R.sup.α, R.sup.β, R.sup.A, R.sup.B, and R.sup.D is independently hydrogen or a substituent selected from the Even More Preferred Substituents defined herein. In some embodiments, each R, R′, R.sup.α, R.sup.β, R.sup.A, R.sup.B, and R.sup.D is independently hydrogen or a substituent selected from the Most Preferred Substituents defined herein.

[0091] In some embodiments, at least one R.sup.A, R.sup.B, R.sup.C or R.sup.D is selected from the group consisting of the General Substituents defined herein. In some embodiments, at least one R.sup.A is selected from the group consisting of the General Substituents defined herein. In some embodiments, at least one R.sup.B is selected from the group consisting of the General Substituents defined herein. In some embodiments, at least one R.sup.C is selected from the group consisting of the General Substituents defined herein. In some embodiments, at least one R.sup.D is selected from the group consisting of the General Substituents defined herein. In some embodiments, at least one R.sup.A, R.sup.B, R.sup.C or R.sup.D is selected from the group consisting of the Preferred General Substituents defined herein.

[0092] In some embodiments, R.sup.C is a substituent selected from the group consisting of alkyl, cycloalkyl, heteroalkyl, alkoxy, aryloxy, amino, silyl, germyl, boryl, alkenyl, cycloalkenyl, heteroalkenyl, aryl, heteroaryl, nitrile, isonitrile, sulfanyl, partially or fully deuterated variants thereof, partially or fully fluorinated variants thereof, and combinations thereof.

[0093] In some embodiments, the metal M is selected from the group consisting of Ir, Rh, Re, Ru, Os, Pt, Pd, Ag, Au, and Cu. In some embodiments, the metal M is Ir. In some embodiments, the metal M is Pt.

[0094] In some embodiments, moiety B is selected from the group consisting of the following Cyclic Moiety List: benzene, pyridine, pyrimidine, pyridazine, pyrazine, triazine, imidazole, pyrazole, pyrrole, oxazole, furan, thiophene, thiazole, triazole, naphthalene, quinoline, isoquinoline, quinazoline, quinoxaline, benzofuran, aza-benzofuran, benzoxazole, aza-benzoxazole, benzothiophene, aza-benzothiophene, benzothiazole, aza-benzothiazole, benzoselenophene, aza-benzoselenophene, indene, aza-indene, indole, aza-indole, benzimidazole, aza-benzimidazole, carbazole, aza-carbazole, dibenzofuran, aza-dibenzofuran, dibenzothiophene, aza-dibenzothiophene, phthalazine, phenanthrene, aza-phenanthrene, anthracene, aza-anthracene, phenanthridine, fluorene, and aza-fluorene.

[0095] In some embodiments, the aza variant includes one N on a benzo ring. In some embodiments, the aza variant includes one N on a benzo ring and the N is bonded to the metal M.

[0096] In some embodiments, moiety B is a monocyclic ring. In some embodiments, moiety B is selected from the group consisting of benzene, pyridine, pyrimidine, pyridazine, pyrazine, triazine, imidazole, pyrazole, pyrrole, oxazole, furan, thiophene, thiazole, and triazole. In some embodiments, moiety B is benzene.

[0097] In some embodiments, moiety B is a polycyclic fused ring system. In some embodiments, moiety B is selected from the group consisting of naphthalene, quinoline, isoquinoline, quinazoline, quinoxaline, benzofuran, aza-benzofuran, benzoxazole, aza-benzoxazole, benzothiophene, aza-benzothiophene, benzothiazole, aza-benzothiazole, benzoselenophene, aza-benzoselenophene, indene, aza-indene, indole, aza-indole, benzimidazole, aza-benzimidazole, benzobenzimidazole, aza-benzobenzimidazole, carbazole, aza-carbazole, dibenzofuran, aza-dibenzofuran, phenanthro[3,2-b]benzofuran, dibenzothiophene, aza-dibenzothiophene, phthalazine, phenanthrene, aza-phenanthrene, anthracene, aza-anthracene, phenanthridine, fluorene, and aza-fluorene. In some embodiments, moiety B is naphthalene or benzothiophene.

[0098] In some embodiments, X.sup.1 and X.sup.2 are both C.

[0099] In some embodiments, one of X.sup.1 and X.sup.2 is C and the other of X.sup.1 and

X.sup.2 is N. In some embodiments, X.sup.1 is C and X.sup.2 is N. In some embodiments, X.sup.1 is N and X.sup.2 is C.
[0100] In some embodiments, each of X.sup.3 to X.sup.5 is C. In some embodiments, at least one of X.sup.3 to X.sup.5 is N. In some embodiments, X.sup.5 is N.
[0101] In some embodiments, Y.sup.1 is selected from the group consisting of O, S, and Se. In some embodiments, Y.sup.1 is S.
[0102] In some embodiments, Y.sup.1 is selected from the group consisting of BR, NR, and PR.
[0103] In some embodiments, Y.sup.1 is selected from the group consisting of BRR′, CRR′, SiRR′, and GeRR′.
[0104] In some embodiments, Y.sup.1 is selected from the group consisting of P(O)R, C═O, C═S, C═Se, C═NR, C═CRR′, S═O, and SO.sub.2.
[0105] In some embodiments, Y.sup.1 is CR.
[0106] In some embodiments, Y.sup.2 is selected from the group consisting of O, S, and Se. In some embodiments, Y.sup.1 is S.
[0107] In some embodiments, Y.sup.2 is selected from the group consisting of BR, NR, and PR.
[0108] In some embodiments, Y.sup.2 is selected from the group consisting of BRR′, CRR′, SiRR′, and GeRR′. In some embodiments, Y.sup.2 is selected from the group consisting of CRR′, SiRR′, and GeRR′.
[0109] In some embodiments, Y.sup.2 is CRR′. In some embodiments, each of R and R′ is independently an alkyl group.
[0110] In some embodiments, Y.sup.2 is selected from the group consisting of P(O)R, C═O, C═S, C═Se, C═NR, C═CRR′, S═O, and SO.sub.2.
[0111] In some embodiments, Y.sup.2 is CR.
[0112] In some embodiments, K is selected from the group consisting of a direct bond, O, and S. In some embodiments, K is O or S. In some embodiments, K is a direct bond.
[0113] In some embodiments, K is selected from the group consisting of N(R.sup.α), P(R.sup.α), and B(R.sup.α).
[0114] In some embodiments, K is selected from the group consisting of C(R.sup.α) (R.sup.β), and Si(R.sup.α) (R.sup.β).
[0115] In some embodiments, the first ligand L.sub.A comprises an electron-withdrawing group selected from the group consisting of the structures in the following EWG1 LIST: F, CF.sub.3, CN, COCH.sub.3, CHO, COCF.sub.3, COOMe, COOCF.sub.3, NO.sub.2, SF.sub.3, SiF.sub.3, PF.sub.4, SF.sub.5, OCF.sub.3, SCF.sub.3, SeCF.sub.3, SOCF.sub.3, SeOCF.sub.3, SO.sub.2F, SO.sub.2CF.sub.3, SeO.sub.2CF.sub.3, OSeO.sub.2CF.sub.3, OCN, SCN, SeCN, NC, .sup.+N(R.sup.k2).sub.3, (R.sup.k2).sub.2CCN, (R.sup.k2).sub.2CCF.sub.3, CNC(CF.sub.3).sub.2, BR.sup.k3R.sup.k2, substituted or unsubstituted dibenzoborole, 1-substituted carbazole, 1,9-substituted carbazole, substituted or unsubstituted carbazole, substituted or unsubstituted pyridine, substituted or unsubstituted pyrimidine, substituted or unsubstituted pyrazine, substituted or unsubstituted pyridoxine, substituted or unsubstituted triazine, substituted or unsubstituted oxazole, substituted or unsubstituted benzoxazole, substituted or unsubstituted thiazole, substituted or unsubstituted benzothiazole, substituted or unsubstituted imidazole, substituted or unsubstituted benzimidazole, ketone, carboxylic acid, ester, nitrile, isonitrile, sulfinyl, sulfonyl, partially and fully fluorinated alkyl, partially and fully fluorinated aryl, partially and fully fluorinated heteroaryl, cyano-containing alkyl, cyano-containing aryl, cyano-containing heteroaryl, isocyanate, ##STR00008## ##STR00009## [0116] wherein each R.sup.k1 represents mono to the maximum allowable substitution, or no substitutions; [0117] wherein Y.sup.G is selected from the group consisting of BR.sub.e, NR.sub.e, PR.sub.e, O, S, Se, C═O, S═O, SO.sub.2, CR.sub.eR.sub.f, SiR.sub.eR.sub.f, and GeR.sub.eR.sub.f; and [0118] wherein each of R.sup.k1, R.sup.k2, R.sup.k3, R.sub.e, and R.sub.f is independently a hydrogen, or a substituent selected from the group consisting of the General Substituents defined herein.

[0119] In some embodiments, the first ligand L.sub.A comprises an electron-withdrawing group selected from the group consisting of the structures of the following EWG2 List:
##STR00010## ##STR00011## ##STR00012## ##STR00013## ##STR00014## ##STR00015## ##STR00016## ##STR00017## ##STR00018## ##STR00019##
[0120] In some embodiments, the first ligand L.sub.A comprises an electron-withdrawing group selected from the group consisting of the structures of the following EWG3 LIST:
##STR00020## ##STR00021## ##STR00022## ##STR00023##
[0121] In some embodiments, the first ligand L.sub.A comprises an electron-withdrawing group selected from the group consisting of the structures of the following EWG4 LIST:
##STR00024##
[0122] In some embodiments, the first ligand L.sub.A comprises a T-electron deficient electron-withdrawing group selected from the group consisting of the structures of the following Pi-EWG LIST: CN, COCH.sub.3, CHO, COCF.sub.3, COOMe, COOCF.sub.3, NO.sub.2, SF.sub.3, SiF.sub.3, PF.sub.4, SF.sub.5, OCF.sub.3, SCF.sub.3, SeCF.sub.3, SOCF.sub.3, SeOCF.sub.3, SO.sub.2F, SO.sub.2CF.sub.3, SeO.sub.2CF.sub.3, OSeO.sub.2CF.sub.3, OCN, SCN, SeCN, NC, .sup.+N(R.sup.k2).sub.3, BR.sup.K2R.sup.k3, substituted or unsubstituted dibenzoborole, 1-substituted carbazole, 1,9-substituted carbazole, substituted or unsubstituted carbazole, substituted or unsubstituted pyridine, substituted or unsubstituted pyrimidine, substituted or unsubstituted pyrazine, substituted or unsubstituted pyridazine, substituted or unsubstituted triazine, substituted or unsubstituted oxazole, substituted or unsubstituted benzoxazole, substituted or unsubstituted thiazole, substituted or unsubstituted benzothiazole, substituted or unsubstituted imidazole, substituted or unsubstituted benzimidazole, ketone, carboxylic acid, ester, nitrile, isonitrile, sulfinyl, sulfonyl, partially and fully fluorinated aryl, partially and fully fluorinated heteroaryl, cyano-containing aryl, cyano-containing heteroaryl, isocyanate,
##STR00025## ##STR00026##
wherein the variables are the same as previously defined.
[0123] In some embodiments, at least one R.sup.A is not hydrogen. In some embodiments, at least one R.sup.A comprises at least one C atom. In some embodiments, at least one R.sup.A comprises a substituent selected from the group consisting of alkyl, cycloalkyl, aryl, heteroaryl, and combinations thereof.
[0124] In some embodiments, two R.sup.A are joined or fused to form a Moiety Al. In some embodiments, Moiety Al is selected from the group consisting of Cyclic Moiety List defined herein. In some embodiments, Moiety Al is benzene.
[0125] In some embodiments, at least one R.sup.A is or comprises an electron-withdrawing group. In some embodiments, at least one R.sup.A is or comprises an electron-withdrawing group from the EWG1 LIST defined herein. In some embodiments, at least one R.sup.A is or comprises an electron-withdrawing group from the EWG2 LIST as defined herein. In some embodiments, at least one R.sup.A is or comprises an electron-withdrawing group from the EWG3 LIST as defined herein. In some embodiments, at least one R.sup.A is or comprises an electron-withdrawing group from the EWG4 LIST as defined herein. In some embodiments, at least one R.sup.A is or comprises an electron-withdrawing group from the Pi-EWG LIST as defined herein.
[0126] In some embodiments, at least one R.sup.B is not hydrogen. In some embodiments, at least one R.sup.B comprises at least one C atom. In some embodiments, at least one R.sup.B comprises a substituent selected from the group consisting of alkyl, cycloalkyl, aryl, heteroaryl, and combinations thereof. In some embodiments, two R.sup.B are joined or fused to form a ring.
[0127] In some embodiments, at least one R.sup.B is or comprises an electron-withdrawing group. In some embodiments, at least one R.sup.B is or comprises an electron-withdrawing group from the EWG1 LIST defined herein. In some embodiments, at least one R.sup.B is or comprises an electron-withdrawing group from the EWG2 LIST as defined herein. In some embodiments, at least one R.sup.B is or comprises an electron-withdrawing group from the EWG3 LIST as defined

herein. In some embodiments, at least one R.sup.B is or comprises an electron-withdrawing group from the EWG4 LIST as defined herein. In some embodiments, at least one R.sup.B is or comprises an electron-withdrawing group from the Pi-EWG LIST as defined herein.
[0128] In some embodiments, at least one R.sup.D is not hydrogen. In some embodiments, at least one R.sup.D comprises at least one C atom. In some embodiments, at least one R.sup.D comprises a substituent selected from the group consisting of alkyl, cycloalkyl, aryl, heteroaryl, and combinations thereof. In some embodiments, two R.sup.D are joined or fused to form a ring.
[0129] In some embodiments, at least one R.sup.D is or comprises an electron-withdrawing group. In some embodiments, at least one R.sup.D is or comprises an electron-withdrawing group from the EWG1 LIST defined herein. In some embodiments, at least one R.sup.D is or comprises an electron-withdrawing group from the EWG2 LIST as defined herein. In some embodiments, at least one R.sup.D is or comprises an electron-withdrawing group from the EWG3 LIST as defined herein. In some embodiments, at least one R.sup.D is or comprises an electron-withdrawing group from the EWG4 LIST as defined herein. In some embodiments, at least one R.sup.D is or comprises an electron-withdrawing group from the Pi-EWG LIST as defined herein.
[0130] In some embodiments, at least one R or R′ is not hydrogen. In some embodiments, at least one R or R′ comprises at least one C atom. In some embodiments, at least one R or R′ comprises a substituent selected from the group consisting of alkyl, cycloalkyl, aryl, heteroaryl, and combinations thereof. In some embodiments, R and R′ are joined or fused to form a ring.
[0131] In some embodiments, at least one R or R′ is or comprises an electron-withdrawing group. In some embodiments, at least one R or R′ is or comprises an electron-withdrawing group from the EWG1 LIST defined herein. In some embodiments, at least one R or R′ is or comprises an electron-withdrawing group from the EWG2 LIST as defined herein. In some embodiments, at least one R or R′ is or comprises an electron-withdrawing group from the EWG3 LIST as defined herein. In some embodiments, at least one R or R′ is or comprises an electron-withdrawing group from the EWG4 LIST as defined herein. In some embodiments, at least one R or R′ is or comprises an electron-withdrawing group from the Pi-EWG LIST as defined herein.
[0132] In some embodiments, at least one R.sup.α or R.sup.β is not hydrogen. In some embodiments, at least one R.sup.α or R.sup.β comprises at least one C atom. In some embodiments, at least one R.sup.α or R.sup.β comprises a substituent selected from the group consisting of alkyl, cycloalkyl, aryl, heteroaryl, and combinations thereof. In some embodiments, R.sup.α and R.sup.β are joined or fused to form a ring.
[0133] In some embodiments, at least one R.sup.α or R.sup.β is or comprises an electron-withdrawing group. In some embodiments, at least one R.sup.α or R.sup.β is or comprises an electron-withdrawing group from the EWG1 LIST defined herein. In some embodiments, at least one R.sup.α or R.sup.β is or comprises an electron-withdrawing group from the EWG2 LIST as defined herein. In some embodiments, at least one R.sup.α or R.sup.β is or comprises an electron-withdrawing group from the EWG3 LIST as defined herein. In some embodiments, at least one R.sup.α or R.sup.β is or comprises an electron-withdrawing group from the EWG4 LIST as defined herein. In some embodiments, at least one R.sup.α or R.sup.β is or comprises an electron-withdrawing group from the Pi-EWG LIST as defined herein.
[0134] In some embodiments, R.sup.C comprises at least one silyl or germyl group. In some embodiments, R.sup.C comprises at least one silyl. In some embodiments, R.sup.C comprises at least one germyl.
[0135] In some embodiments, R.sup.C is or comprises -L-Q (R.sup.1A) (R.sup.1B) (R.sup.1C), wherein L is an organic linker or a direct bond, Q is Si or Ge, and wherein RIA, R.sup.1B, and R.sup.1C are each independently hydrogen or a substituent selected from the group consisting of the General Substituents defined herein.
[0136] In some embodiments, at least one of RIA, R.sup.1B, or R.sup.1C comprises at least one C atom. In some embodiments, at least two of R.sup.1A, R.sup.1B, or R.sup.1C comprises at least

one C atom. In some embodiments, each of RIA, R.sup.1B, or R.sup.1C comprises at least one C atom.
[0137] In some embodiments, at least one of RIA, R.sup.1B, or R.sup.1C is selected from the group consisting of alkyl, cycloalkyl, aryl, heteroaryl, partially or fully deuterated variants thereof, partially or fully fluorinated variants thereof, and combinations thereof. In some embodiments, at least two of RIA, R.sup.1B, or R.sup.1C are independently selected from the group consisting of alkyl, cycloalkyl, aryl, heteroaryl, partially or fully deuterated variants thereof, partially or fully fluorinated variants thereof, and combinations thereof. In some embodiments, each of R.sup.1A, R.sup.1B, or R.sup.1C is independently selected from the group consisting of alkyl, cycloalkyl, aryl, heteroaryl, partially or fully deuterated variants thereof, partially or fully fluorinated variants thereof, and combinations thereof.
[0138] In some embodiments, at least one of R.sup.1A, R.sup.1B, or R.sup.1C is or comprises an electron-withdrawing group. In some embodiments, at least one of RIA, R.sup.1B, or R.sup.1C is or comprises an electron-withdrawing group from the EWG1 LIST defined herein. In some embodiments, at least one of R.sup.1A, R.sup.1B, or R.sup.1C is or comprises an electron-withdrawing group from the EWG2 LIST as defined herein. In some embodiments, at least one of RIA, R.sup.1B, or R.sup.1C is or comprises an electron-withdrawing group from the EWG3 LIST as defined herein. In some embodiments, at least one of R.sup.1A, R.sup.1B, or R.sup.1C is or comprises an electron-withdrawing group from the EWG4 LIST as defined herein. In some embodiments, at least one of RIA, R.sup.1B, or R.sup.1C is or comprises an electron-withdrawing group from the Pi-EWG LIST as defined herein.
[0139] In some embodiments, L is a direct bond.
[0140] In some embodiments, L is an organic linker selected from the group consisting of BR, BRR′, NR, PR, P(O)R, O, S, Se, C—O, C═S, C═Se, C═NR, C═CRR′, S═O, SO.sub.2, CR, CRR′, SiRR′, GeRR′, alkyl, cycloalkyl, aryl, heteroaryl, and combinations thereof.
[0141] In some embodiments, L is an organic linker selected from the group consisting of alkyl, cycloalkyl, aryl, heteroaryl, and combinations thereof.
[0142] In some embodiments, L comprises alkyl. In some embodiments, L is alkyl.
[0143] In some embodiments, L comprises cycloalkyl. In some embodiments, L is cycloalkyl.
[0144] In some embodiments, L comprises aryl. In some embodiments, L is aryl.
[0145] In some embodiments, L comprises heteroaryl. In some embodiments, L is heteroaryl.
[0146] In some embodiments, Q is Si. In some embodiments, Q is Si.
[0147] In some embodiments, R.sup.1A is not hydrogen. In some embodiments, R.sup.1A is alkyl or aryl. In some embodiments, R.sup.1A is alkyl. In some embodiments, R.sup.1A is aryl.
[0148] In some embodiments, R.sup.1B is not hydrogen. In some embodiments, R.sup.1B is alkyl or aryl. In some embodiments, R.sup.1B is alkyl. In some embodiments, R.sup.1B is aryl.
[0149] In some embodiments, R.sup.1C is not hydrogen. In some embodiments, R.sup.1C is alkyl or aryl. In some embodiments, R.sup.1C is alkyl. In some embodiments, R.sup.1C is aryl.
[0150] In some embodiments, at least one of RIA, R.sup.1B, and R.sup.1C is alkyl. In some embodiments, each of RIA, R.sup.1B, and R.sup.1C is independently alkyl. In some embodiments, each of R.sup.1A, R.sup.1B, and R.sup.1C is methyl.
[0151] In some embodiments, at least one of R.sup.1A, R.sup.1B, and R.sup.1C is aryl. In some embodiments, each of R.sup.1A, RIB, and R.sup.1C is independently aryl.
[0152] In some embodiments, R.sup.C may be selected from the group consisting of the structures of the following LIST 1:
##STR00027## ##STR00028## ##STR00029## ##STR00030## ##STR00031## ##STR00032## ##STR00033## ##STR00034## ##STR00035## ##STR00036## ##STR00037## ##STR00038## ##STR00039## ##STR00040## ##STR00041## ##STR00042## ##STR00043## ##STR00044## ##STR00045## ##STR00046## ##STR00047## ##STR00048## ##STR00049## ##STR00050## ##STR00051## ##STR00052## ##STR00053## ##STR00054## ##STR00055## ##STR00056##

##STR00057## ##STR00058## ##STR00059## ##STR00060##
[0153] In some embodiments, R.sup.C has the structure of Formula II:
##STR00061##
[0154] In some embodiments, moiety D is selected from the group consisting of Cyclic Moiety List defined herein.
[0155] In some embodiments, moiety D is an aza variant. In some such embodiments, the aza variant includes one N on a benzo ring.
[0156] In some embodiments, moiety D is a monocyclic ring. In some embodiments, moiety D is selected from the group consisting of benzene, pyridine, pyrimidine, pyridazine, pyrazine, triazine, imidazole, pyrazole, pyrrole, oxazole, furan, thiophene, thiazole, and triazole. In some embodiments, moiety D is benzene.
[0157] In some embodiments, moiety D is a polycyclic fused ring system. In some embodiments, moiety D is selected from the group consisting of naphthalene, quinoline, isoquinoline, quinazoline, quinoxaline, benzofuran, aza-benzofuran, benzoxazole, aza-benzoxazole, benzothiophene, aza-benzothiophene, benzothiazole, aza-benzothiazole, benzoselenophene, aza-benzoselenophene, indene, aza-indene, indole, aza-indole, benzimidazole, aza-benzimidazole, carbazole, aza-carbazole, dibenzofuran, aza-dibenzofuran, dibenzothiophene, aza-dibenzothiophene, phthalazine, phenanthrene, aza-phenanthrene, anthracene, aza-anthracene, phenanthridine, fluorene, and aza-fluorene. In some embodiments moiety D is naphthalene.
[0158] In some embodiments, two R.sup.D are joined to form a ring, where the portion formed by the two R.sup.D is saturated.
[0159] In some embodiments, two R.sup.D are joined to form a substituted or unsubstituted 6-membered ring.
[0160] In some embodiments, moiety D is a 6-membered ring and R.sup.D bonds at a para position relative to the bond to Formula I. In some embodiments, moiety D is benzene. In some embodiments, the para R.sup.D is selected from the group consisting of alkyl, cycloalkyl, and aryl. In some embodiments, the para R.sup.D is alkyl. In some embodiments, the para R.sup.D is neopentyl. In some embodiments, the para R.sup.D is cycloalkyl. In some embodiments, the para R.sup.D is cyclohexane. In some embodiments, the para R.sup.D is aryl. In some embodiments, the para R.sup.D is 3,5-di-tert-butylbenzene.
[0161] In some embodiments, R.sup.C is or comprises an electron-withdrawing group from the EWG1 LIST as defined herein. In some embodiments, R.sup.C is or comprises an electron-withdrawing group from the EWG2 LIST as defined herein. In some embodiments, R.sup.C is or comprises an electron-withdrawing group from the EWG3 LIST as defined herein. In some embodiments, R.sup.C is or comprises an electron-withdrawing group from the EWG4 LIST as defined herein. In some embodiments, R.sup.C is or comprises an electron-withdrawing group from the Pi-EWG LIST as defined herein.
[0162] In some embodiments, the ligand L.sub.A is selected from the group consisting of the structures of the following LIST 2:
##STR00062## ##STR00063## ##STR00064## ##STR00065## ##STR00066## ##STR00067## ##STR00068## [0163] wherein X, for each occurrence, is independently C or N; [0164] Y.sup.B1 and Y.sup.B2 are each independently selected from the group consisting of a direct bond, BR, BRR′, NR, PR, P(O)R, O, S, Se, C═O, C═S, C═Se, C═NR, C═CRR′, S═O, SO.sub.2, CR, CRR′, SiRR′, and GeRR′; [0165] R.sup.BB represents mono to the maximum allowable substitution, or no substitution; [0166] each R.sup.BB is independently hydrogen, or a substituent selected from the group consisting of deuterium, halogen, alkyl, cycloalkyl, heteroalkyl, heterocycloalkyl, arylalkyl, alkoxy, aryloxy, amino, silyl, germyl, boryl, alkenyl, cycloalkenyl, heteroalkenyl, alkynyl, aryl, heteroaryl, acyl, carboxylic acid, ether, ester, nitrile, isonitrile, sulfanyl, sulfinyl, sulfonyl, phosphino, selenyl, and combinations thereof; [0167] the remaining variables are the same as previously defined; and [0168] any two substituents can be joined or fused to form a ring.

[0169] In some embodiments where ligand L.sub.A is selected from LIST 2, at least one R.sup.A, R.sup.BB, or R.sup.C is selected from the group consisting of the General Substituents defined herein. In some embodiments, at least one R.sup.A is selected from the group consisting of the General Substituents defined herein. In some embodiments, at least one R.sup.BB is selected from the group consisting of the General Substituents defined herein. In some embodiments, at least one R.sup.C is selected from the group consisting of the General Substituents defined herein. In some embodiments, at least one R.sup.A, R.sup.BB, or R.sup.C is selected from the group consisting of the Preferred General Substituents defined herein.
[0170] In some embodiments where ligand L.sub.A is a structure selected from the group consisting of the structures in LIST 2, where R.sup.C is selected from the group consisting of the structures in LIST 1.
[0171] In some embodiments, for the structures of LIST 2, at least one of R.sup.A, R.sup.BB or R.sup.C is partially or fully deuterated. In some embodiments, at least one R.sup.A is partially or fully deuterated. In some embodiments, at least one R.sup.BB is partially or fully deuterated. In some embodiments, at least one R.sup.C is partially or fully deuterated. In some embodiments, at least one R or R′ is partially or fully deuterated.
[0172] In some embodiments, for the structures of LIST 2, at least one R.sup.A is not hydrogen. In some embodiments, at least one R.sup.A comprises at least one C atom. In some embodiments, two R.sup.A are joined or fused to form a ring.
[0173] In some embodiments, for the structures of LIST 2, at least one R.sup.BB is not hydrogen. In some embodiments, at least one R.sup.BB comprises at least one C atom. In some embodiments, two R.sup.BB are joined or fused to form a ring.
[0174] In some embodiments, for the structures of LIST 2, at least one R.sup.A is or comprises an electron-withdrawing group from the EWG1 LIST as defined herein. In some embodiments, at least one R.sup.A is or comprises an electron-withdrawing group from the EWG2 LIST as defined herein. In some embodiments, at least one R.sup.A is or comprises an electron-withdrawing group from the EWG3 LIST as defined herein. In some embodiments, at least one R.sup.A is or comprises an electron-withdrawing group from the EWG4 LIST as defined herein. In some embodiments, at least one R.sup.A is or comprises an electron-withdrawing group from the Pi-EWG LIST as defined herein.
[0175] In some embodiments, for the structures of LIST 2, at least one R.sup.BB is or comprises an electron-withdrawing group from the EWG1 LIST as defined herein. In some embodiments, at least one R.sup.BB is or comprises an electron-withdrawing group from the EWG2 LIST as defined herein. In some embodiments, at least one R.sup.BB is or comprises an electron-withdrawing group from the EWG3 LIST as defined herein. In some embodiments, at least one R.sup.BB is or comprises an electron-withdrawing group from the EWG4 LIST as defined herein. In some embodiments, at least one R.sup.BB is or comprises an electron-withdrawing group from the Pi-EWG LIST as defined herein.
[0176] In some embodiments, for the structures of LIST 2, R.sup.C is or comprises an electron-withdrawing group from the EWG1 LIST as defined herein. In some embodiments, R.sup.C is or comprises an electron-withdrawing group from the EWG2 LIST as defined herein. In some embodiments, R.sup.C is or comprises an electron-withdrawing group from the EWG3 LIST as defined herein. In some embodiments, R.sup.C is or comprises an electron-withdrawing group from the EWG4 LIST as defined herein. In some embodiments, R.sup.C is or comprises an electron-withdrawing group from the Pi-EWG LIST as defined herein.
[0177] In some embodiments, the ligand L.sub.A is selected from the group consisting of the structures of the following LIST 3:
##STR00069## ##STR00070## ##STR00071## ##STR00072## ##STR00073## ##STR00074## ##STR00075## [0178] wherein X, for each, occurrence is independently C or N; [0179] Y.sup.B1 and Y.sup.B2 are each independently selected from the group consisting of a direct bond, BR,

BRR′, NR, PR, P(O)R, O, S, Se, C═O, C═S, C═Se, C═NR, C═CRR′, S═O, SO.sub.2, CR, CRR′, SiRR′, and GeRR′; [0180] R.sup.BB represents mono to the maximum allowable substitution, or no substitution; [0181] each R.sup.BB is independently hydrogen, or a substituent selected from the group consisting of deuterium, halogen, alkyl, cycloalkyl, heteroalkyl, heterocycloalkyl, arylalkyl, alkoxy, aryloxy, amino, silyl, germyl, boryl, alkenyl, cycloalkenyl, heteroalkenyl, alkynyl, aryl, heteroaryl, acyl, carboxylic acid, ether, ester, nitrile, isonitrile, sulfanyl, sulfinyl, sulfonyl, phosphino, selenyl, and combinations thereof; [0182] the remaining variables are the same as previously defined; and [0183] any two substituents can be joined or fused to form a ring.

[0184] In some embodiments where ligand L.sub.A is selected from LIST 3, at least one R.sup.A, R.sup.BB, or R.sup.C is selected from the group consisting of the General Substituents defined herein. In some embodiments, at least one R.sup.A is selected from the group consisting of the General Substituents defined herein. In some embodiments, at least one R.sup.BB is selected from the group consisting of the General Substituents defined herein. In some embodiments, at least one R.sup.C is selected from the group consisting of the General Substituents defined herein. In some embodiments, at least one R.sup.A, R.sup.BB, or R.sup.C is selected from the group consisting of the Preferred General Substituents defined herein.

[0185] In some embodiments where ligand L.sub.A is a structure selected from LIST 3, R.sup.C is selected from the group of LIST 1 as defined herein.

[0186] In some embodiments, for the structures of LIST 3, at least one of R.sup.A, R.sup.BB or R.sup.C is partially or fully deuterated. In some embodiments, at least one R.sup.A is partially or fully deuterated. In some embodiments, at least one R.sup.BB is partially or fully deuterated. In some embodiments, at least one R.sup.C is partially or fully deuterated. In some embodiments, at least one R or R′ is partially or fully deuterated.

[0187] In some embodiments, for the structures of LIST 3, at least one R.sup.A is or comprises an electron-withdrawing group from the EWG1 LIST as defined herein. In some embodiments, at least one R.sup.A is or comprises an electron-withdrawing group from the EWG2 LIST as defined herein. In some embodiments, at least one R.sup.A is or comprises an electron-withdrawing group from the EWG3 LIST as defined herein. In some embodiments, at least one R.sup.A is or comprises an electron-withdrawing group from the EWG4 LIST as defined herein. In some embodiments, at least one R.sup.A is or comprises an electron-withdrawing group from the Pi-EWG LIST as defined herein.

[0188] In some embodiments, for the structures of LIST 3, at least one R.sup.BB is or comprises an electron-withdrawing group from the EWG1 LIST as defined herein. In some embodiments, at least one R.sup.BB is or comprises an electron-withdrawing group from the EWG2 LIST as defined herein. In some embodiments, at least one R.sup.BB is or comprises an electron-withdrawing group from the EWG3 LIST as defined herein. In some embodiments, at least one R.sup.BB is or comprises an electron-withdrawing group from the EWG4 LIST as defined herein. In some embodiments, at least one R.sup.BB is or comprises an electron-withdrawing group from the Pi-EWG LIST as defined herein.

[0189] In some embodiments, for the structures of LIST 3, R.sup.C is or comprises an electron-withdrawing group from the EWG1 LIST as defined herein. In some embodiments, R.sup.C is or comprises an electron-withdrawing group from the EWG2 LIST as defined herein. In some embodiments, R.sup.C is or comprises an electron-withdrawing group from the EWG3 LIST as defined herein. In some embodiments, R.sup.C is or comprises an electron-withdrawing group from the EWG4 LIST as defined herein. In some embodiments, R.sup.C is or comprises an electron-withdrawing group from the Pi-EWG LIST as defined herein.

[0190] In some embodiments, the ligand L.sub.A is selected from L.sub.A1 (R.sup.EA) (R.sup.EB) (R.sup.EC) (R.sup.ED) (R.sup.EE); wherein i is an integer from 1 to 152, each of R.sup.EB, R.sup.EC, R.sup.ED, and R.sup.EE is independently selected from the group consisting of R.sub.1 to R.sub.295; R.sup.EA is selected from the group consisting of R.sub.66 to R.sub.295, wherein

each of L.sub.A1 (R.sub.66) (R.sub.1) (R.sub.1) (R.sub.1) (R.sub.1) (R.sub.1) to L.sub.A152 (R.sub.295) (R.sub.295) (R.sub.295) (R.sub.295) (R.sub.295) is defined in the following LIST 4: TABLE-US-00002 L.sub.A Structure of L.sub.A L.sub.A1(R.sup.EA)(R.sup.EB)(R.sup.EC) (R.sup.ED)(R.sup.EE), wherein L.sub.A1(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A1(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00076]  L.sub.A2(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A2(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A2(R.sub.295)(R.sub.295) (R.sub.295)(R.sub.295) (R.sub.295) have the structure [00077]  L.sub.A3(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A3(R.sub.66) (R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A3(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00078]  L.sub.A4(R.sup.EA)(R.sup.EB) (R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A4(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1) (R.sub.1) to L.sub.A4(R.sub.395)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00079]  L.sub.A5(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein L.sub.A5(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A5(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00080]  L.sub.A6(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A6(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A6(R.sub.295)(R.sub.295) (R.sub.295)(R.sub.295) (R.sub.295) have the structure [00081]  L.sub.A7(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A7)(R.sub.66) (R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A7(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00082]  L.sub.A8(R.sup.EA)(R.sup.EB) (R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A8(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1) (R.sub.1) to L.sub.A8(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00083]  L.sub.A9(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein L.sub.A9(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A9(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00084]  L.sub.A10(R.sup.EA)(R.sup.EE)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A10(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A10(R.sub.295)(R.sub.295) (R.sub.295)(R.sub.295) (R.sub.295) have the structure [00085]  L.sub.A11(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A11(R.sub.66) (R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A11(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00086]  L.sub.A12(R.sup.EA)(R.sup.EB) (R.sup.EC)(R.sup.ED)(R.sup.EB), wherein L.sub.A12(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1) (R.sub.1) to L.sub.A12(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00087]  L.sub.A13(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein L.sub.A13(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A13(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00088]  L.sub.A14(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A14(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A14(R.sub.295)(R.sub.295) (R.sub.295)(R.sub.295) (R.sub.295) have the structure [00089]  L.sub.A15(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A15(R.sub.66) (R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A15(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00090]  LA.sub.16(R.sup.EA)(R.sup.EB) (R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A16(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1) (R.sub.1) to L.sub.A16(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00091]  L.sub.A17(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein L.sub.A17(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A17(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00092]  L.sub.A18(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein

L.sub.A18(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A18(R.sub.295)(R.sub.295) (R.sub.295)(R.sub.295) (R.sub.295) have the structure [00093]  embedded image L.sub.A19(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EB), wherein L.sub.A19(R.sub.66) (R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A19(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00094]  embedded image L.sub.A20(R.sup.EA)(R.sup.EB) (R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A20(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1) (R.sub.1) to L.sub.A20(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00095]  embedded image L.sub.A21(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein L.sub.A21(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A21(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00096]  embedded image L.sub.A22(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A22(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A22(R.sub.295)(R.sub.295) (R.sub.295)(R.sub.295) (R.sub.295) have the structure [00097]  embedded image L.sub.A23(R.sup.El)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein L.sub.A23(R.sub.66) (R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A23(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00098]  embedded image L.sub.A24(R.sup.EA)(R.sup.EB) (R.sup.EC)(R.sup.ED) (R.sup.EE), wherein L.sub.A24(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1) (R.sub.1) to L.sub.A24(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00099]  embedded image L.sub.A25(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein L.sub.A25(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A25(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00100]  embedded image L.sub.A26(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A26(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A26(R.sub.295)(R.sub.295) (R.sub.295)(R.sub.295) (R.sub.295) have the structure [00101]  embedded image L.sub.A27(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A27(R.sub.66) (R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A27(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00102]  embedded image L.sub.A28(R.sup.EA)(R.sup.EB) (R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A28(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1) (R.sub.1) to L.sub.A28(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00103]  embedded image L.sub.A29(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein L.sub.A29(R.sub.66(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A29(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00104]  embedded image L.sub.A30(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A30(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A30(R.sub.295)(R.sub.295) (R.sub.295)(R.sub.295) (R.sub.295) have the structure [00105]  embedded image L.sub.A31(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A31(R.sub.66) (R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A31(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00106]  embedded image L.sub.A32(R.sup.EA)(R.sup.EB) (R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A32(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1) (R.sub.1) to L.sub.A32(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00107]  embedded image L.sub.A33(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein L.sub.A33(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A33(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00108]  embedded image L.sub.A34(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A34(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A34(R.sub.295)(R.sub.295) (R.sub.295)(R.sub.295) (R.sub.295) have the structure [00109]  embedded image L.sub.A35(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A35(R.sub.66) (R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A35(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00110]  embedded image L.sub.A36(R.sup.EA)(R.sup.EB) (R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A36(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)

(R.sub.1) to L.sub.A36(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00111]  L.sub.A37(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein L.sub.A37(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A37(R.sub.395)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00112] L.sub.A38(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A38(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A38(R.sub.295)(R.sub.295) (R.sub.295)(R.sub.295) (R.sub.295) have the structure [00113]  L.sub.A39(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A39(R.sub.66) (R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A39(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00114] L.sub.A40(R.sup.EA)(R.sup.EB) (R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A40(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1) (R.sub.1) to L.sub.A40(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00115]  L.sub.A41(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein L.sub.A41(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A41(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00116]  L.sub.A42(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A42(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A42(R.sub.295)(R.sub.295) (R.sub.295)(R.sub.295) (R.sub.295) have the structure [00117]  L.sub.A43(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A43(R.sub.66) (R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A43(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00118]  L.sub.A44(R.sup.EA)(R.sup.EB) (R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A44(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1) (R.sub.1) to L.sub.A44(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00119]  L.sub.A45(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EB), wherein L.sub.A45(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A45(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00120] L.sub.A46(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A46(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A46(R.sub.295)(R.sub.295) (R.sub.295)(R.sub.295) (R.sub.295) have the structure [00121]  L.sub.A47(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), herein L.sub.A47(R.sub.66) (R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A47(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00122]  L.sub.A48(R.sup.EA)(R.sup.EB) (R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A48(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1) (R.sub.1) to L.sub.A48(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00123] L.sub.A49(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EB), wherein L.sub.A49(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A49(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00124]  L.sub.A50(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A50(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A50(R.sub.295)(R.sub.295) (R.sub.295)(R.sub.295) (R.sub.295) have the structure [00125]  L.sub.A51(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A51(R.sub.66) (R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A51(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00126] L.sub.A52(R.sup.EA)(R.sup.EB) (R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A52(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1) (R.sub.1) to L.sub.A52(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00127]  L.sub.A53(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein L.sub.A53(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A53(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00128]  L.sub.A54(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A54(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A54(R.sub.295)(R.sub.295)

(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00129]  embedded image L.sub.A55(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A55(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A55(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure [00130]embedded image L.sub.A56(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A56(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A56(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00131]embedded image L.sub.A57(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A57(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A57(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00132]embedded image L.sub.A58(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A58(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A58(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00133]embedded image L.sub.A59(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A59(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A59(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure [00134]embedded image L.sub.A60(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A60(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A60(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structrue [00135]embedded image L.sub.A61(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A61(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A61(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00136]embedded image L.sub.A62(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EF), wherein L.sub.A62(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A62(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00137]embedded image L.sub.A63(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A63(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1) (R.sub.1) to L.sub.A63(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure [00138]embedded image L.sub.A64(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A64(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A64(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00139]embedded image L.sub.A65(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A65(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A65(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00140]embedded image L.sub.A66(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A66(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A66(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00141]embedded image L.sub.A67(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A67(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A67(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure [00142]embedded image L.sub.A68(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A68(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A68(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00143]embedded image L.sub.A69(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A69(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R1) to L.sub.A69(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00144]embedded image L.sub.A70(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A70(R.sub.66)(R.sub.1)(R.sub.1)(R)(R.sub.1) to L.sub.A70(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00145]embedded image L.sub.A71(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A71(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A71(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure [00146]embedded image L.sub.A72(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A72(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A72(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the

structure [00147]embedded image L.sub.A73(R.sup.EA)(R.sup.EE)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A73(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A73(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00148]embedded image L.sub.A74(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A74(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A74(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00149]embedded image L.sub.A75(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherien L.sub.A75(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A75(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure [00150]embedded image L.sub.A76(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A76(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A76(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00151]embedded image L.sub.A77(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A77(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A77(R.sub.925)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00152]embedded image L.sub.A78(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A78(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A78(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00153]embedded image L.sub.A79(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A79(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A79(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure [00154]embedded image L.sub.A80(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A80(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A80(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00155]embedded image L.sub.A81(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A81(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A81(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00156]embedded image L.sub.A82(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A82(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A82(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00157]embedded image L.sub.A83(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A83(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A83(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure [00158]embedded image L.sub.A84(R.sup.EA)(R.sup.EE)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A84(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A84(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00159]embedded image L.sub.A85(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A85(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A85(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00160]embedded image L.sub.A86(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A86(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A86(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00161]embedded image L.sub.A87(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A87(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A87(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure [00162]embedded image L.sub.A88(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A88(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A88(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00163]embedded image L.sub.A89(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A89(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A89(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00164]embedded image L.sub.A90(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A90(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A90(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00165]embedded image

L.sub.A91(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A91(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A91(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure [00166]  embedded image L.sub.A92(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A92(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A92(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00167]  embedded image L.sub.A93(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A93(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A93(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00168]  embedded image L.sub.A94(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A94(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A94(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00169]  embedded image L.sub.A95(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A95(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A95(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure [00170]  embedded image L.sub.A96(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A96(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A96(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00171]  embedded image L.sub.A97(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A97(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A97(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure [00172]  embedded image L.sub.A98(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A98(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A98(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00173]  embedded image L.sub.A99(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A99(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A99(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure [00174]  embedded image L.sub.A100(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein L.sub.A100(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A100(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00175]  embedded image L.sub.A101(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A101(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A101(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00176]  embedded image L.sub.A102(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein L.sub.A102(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A102(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00177]  embedded image L.sub.A103(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein L.sub.A103(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A103(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00178]  embedded image L.sub.A104(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein L.sub.A104(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A104(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00179]  embedded image L.sub.A105(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein L.sub.A105(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A105(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00180]  embedded image L.sub.A106(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein L.sub.A106(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A106(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00181]  embedded image L.sub.A107(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein L.sub.A107(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A017(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00182]  embedded image L.sub.A108(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein L.sub.A108(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A108(R.sub.295)(R.sub.295)

(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00183] 
L.sub.A109(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein
L.sub.A109(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A109(R.sub.295)(R.sub.295)
(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00184] 
L.sub.A110(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein
L.sub.A110(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A110(R.sub.295)(R.sub.295)
(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00185] 
L.sub.A111(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein
L.sub.A111(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A111(R.sub.295)(R.sub.295)
(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00186] 
L.sub.A112(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein
L.sub.A112(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A112(R.sub.295)(R.sub.295)
(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00187] 
L.sub.A113(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein
L.sub.A113(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A113(R.sub.295)(R.sub.295)
(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00188] 
L.sub.A114(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein
L.sub.A114(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A114(R.sub.295)(R.sub.295)
(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00189] 
L.sub.A115(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein
L.sub.A1154(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A115(R.sub.295)(R.sub.295)
(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00190] 
L.sub.A116(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein
L.sub.A116(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A116(R.sub.295)(R.sub.295)
(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00191] 
L.sub.A117(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein
L.sub.A117(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A117(R.sub.295)(R.sub.295)
(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00192] 
L.sub.A118(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein
L.sub.A118(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A118(R.sub.295)(R.sub.295)
(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00193] 
L.sub.A119(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein
L.sub.A119(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A119(R.sub.295)(R.sub.295)
(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00194] 
L.sub.A120(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein
L.sub.A120(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A120(R.sub.295)(R.sub.295)
(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00195] 
L.sub.A121(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein
L.sub.A121(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A121(R.sub.295)(R.sub.295)
(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00196] 
L.sub.A122(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein
L.sub.A122(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A122(R.sub.295)(R.sub.295)
(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00197] 
L.sub.A123(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein
L.sub.A123(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A123(R.sub.295)(R.sub.295)
(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00198] 
L.sub.A124(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein
L.sub.A124(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A124(R.sub.295)(R.sub.295)
(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00199] 
L.sub.A125(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein

L.sub.A125(R.sub.66)(R.sub.1)(R.sub.1)(R1)(R.sub.1) to L.sub.A125(R.sub.295)(R.sub.295)
(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00200]  embedded image
L.sub.A126(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein
L.sub.A126(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A126(R.sub.295)(R.sub.295)
(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00201]  embedded image
L.sub.A127(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein
L.sub.A127(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A127(R.sub.295)(R.sub.295)
(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00202]  embedded image
L.sub.A128(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein
L.sub.A128(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A128(R.sub.295)(R.sub.295)
(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00203]  embedded image
L.sub.A129(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein
L.sub.A129(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A129(R.sub.295)(R.sub.295)
(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00204]  embedded image
L.sub.A130(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein
L.sub.A130(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A130(R.sub.295)(R.sub.295)
(R.sub.259)(R.sub.295) (R.sub.295) have the structure [00205]  embedded image
L.sub.A131(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein
L.sub.A131(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A131(R.sub.295)(R.sub.295)
(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00206]  embedded image
L.sub.A132(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein
L.sub.A132(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A132(R.sub.295)(R.sub.295)
(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00207]  embedded image
L.sub.A133(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.33), wherein
L.sub.A133(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A133(R.sub.295)(R.sub.295)
(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00208]  embedded image
L.sub.A134(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein
L.sub.A134(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A134(R.sub.295)(R.sub.295)
(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00209]  embedded image
L.sub.A135(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein
L.sub.A135(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A135(R.sub.295)(R.sub.295)
(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00210]  embedded image
L.sub.A136(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein
L.sub.A136(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A136(R.sub.295)(R.sub.295)
(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00211]  embedded image
L.sub.A137(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein
L.sub.A137(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A137(R.sub.295)(R.sub.295)
(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00212]  embedded image
L.sub.A138(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein
L.sub.A138(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A138(R.sub.295)(R.sub.295)
(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00213]  embedded image
L.sub.A139(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein
L.sub.A139(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A139(R.sub.295)(R.sub.295)
(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00214]  embedded image
L.sub.A140(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein
L.sub.A140(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A140(R.sub.295)(R.sub.295)
(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00215]  embedded image
L.sub.A141(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein
L.sub.A141(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A141(R.sub.295)(R.sub.295)
(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00216]  embedded image

L.sub.A142(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein L.sub.A142(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A142(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00217] 
L.sub.A143(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein L.sub.A143(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A143(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00218] 
L.sub.A144(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein L.sub.A144(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A144(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00219] 
L.sub.A145(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein L.sub.A145(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A145(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00220] 
L.sub.A146(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein L.sub.A146(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A146(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00221] 
L.sub.A147(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein L.sub.A147(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A147(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00222] 
L.sub.A148(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein L.sub.A148(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A148(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00223] 
L.sub.A149(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein L.sub.A149(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A149(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00224] 
L.sub.A150(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein L.sub.A150(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A150(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00225] 
L.sub.A151(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein L.sub.A151(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A151(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00226] 
L.sub.A152(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED) (R.sup.EE), wherein L.sub.A152(R.sub.66)(R.sub.1)(R.sub.1)(R1)(R.sub.1) to L.sub.A152(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) (R.sub.295) have the structure [00227]  [0191] wherein R.sub.1 to R.sub.295 have the structures in the following LIST 5:

##STR00228## ##STR00229## ##STR00230## ##STR00231## ##STR00232## ##STR00233## ##STR00234## ##STR00235## ##STR00236## ##STR00237## ##STR00238## ##STR00239## ##STR00240## ##STR00241## ##STR00242## ##STR00243## ##STR00244## ##STR00245## ##STR00246## ##STR00247## ##STR00248## ##STR00249## ##STR00250## ##STR00251## ##STR00252## ##STR00253## ##STR00254## ##STR00255## ##STR00256## ##STR00257## ##STR00258## ##STR00259## ##STR00260## ##STR00261## ##STR00262## ##STR00263## ##STR00264## ##STR00265## ##STR00266##

[0192] In some embodiments, the compound has a formula of M(L.sub.A).sub.p(L.sub.B).sub.q(L.sub.c), wherein L.sub.B and L.sub.c are each a bidentate ligand; and wherein p is 1, 2, or 3; q is 0, 1, or 2; r is 0, 1, or 2; and p+q+r is the oxidation state of the metal M.

[0193] In some embodiments, L.sub.B comprises an electron-withdrawing group from the EWG1 LIST as defined herein. In some embodiments, L.sub.B comprises an electron-withdrawing group from the EWG2 LIST as defined herein. In some embodiments, L.sub.B comprises an electron-withdrawing group from the EWG3 LIST as defined herein. In some embodiments, L.sub.B comprises an electron-withdrawing group from the EWG4 LIST as defined herein. In some

embodiments, L.sub.B comprises an electron-withdrawing group from the Pi-EWG LIST as defined herein.
[0194] In some embodiments, L.sub.c comprises an electron-withdrawing group from the EWG1 LIST as defined herein. In some embodiments, L.sub.c comprises an electron-withdrawing group from the EWG2 LIST as defined herein. In some embodiments, L.sub.c comprises an electron-withdrawing group from the EWG3 LIST as defined herein. In some embodiments, L.sub.c comprises an electron-withdrawing group from the EWG4 LIST as defined herein. In some embodiments, L.sub.c comprises an electron-withdrawing group from the Pi-EWG LIST as defined herein.
[0195] In some embodiments, the compound has a formula selected from the group consisting of Ir(L.sub.A).sub.3, Ir(L.sub.A) (L.sub.B).sub.2, Ir(L.sub.A).sub.2 (L.sub.B), Ir(L.sub.A).sub.2 (L.sub.c), and Ir(L.sub.A) (L.sub.B) (L.sub.c); and wherein L.sub.A, L.sub.B, and L.sub.c are different from each other.
[0196] In some embodiments, L.sub.B is a substituted or unsubstituted phenylpyridine, and L.sub.c is a substituted or unsubstituted acetylacetonate.
[0197] In some embodiments, the compound has a formula of Pt(L.sub.A) (L.sub.B); and wherein L.sub.A and L.sub.B can be same or different. In some embodiments, L.sub.A and L.sub.B are connected to form a tetradentate ligand.
[0198] In some embodiments, L.sub.B and L.sub.c are each independently selected from the group consisting of the structures of the following LIST 6:
##STR00267## ##STR00268## ##STR00269## ##STR00270##
[0199] wherein: [0200] T is selected from the group consisting of B, Al, Ga, and In; [0201] K.sup.1′ is selected from the group consisting of a single bond, O, S, NR.sub.e, PR.sub.e, BR.sub.e, CR.sub.eR.sub.f, and SiR.sub.eR.sub.f; [0202] each of Y.sup.1 to Y.sup.13 is independently selected from the group consisting of C and N; [0203] Y′ is selected from the group consisting of BR.sub.e, BR.sub.eR.sub.f, NR.sub.e, PR.sub.e, P(O)R.sub.e, O, S, Se, C═O, C═S, C═Se, C═NR.sub.e, C═CR.sub.eR.sub.f, S═O, SO.sub.2, CR.sub.eR.sub.f, SiR.sub.eR.sub.f, and GeR.sub.eR.sub.f; [0204] R.sub.e and R.sub.f can be fused or joined to form a ring; [0205] each R.sub.a, R.sub.b, R.sub.c, and R.sub.d independently represents from mono to the maximum allowed number of substitutions, or no substitution; [0206] each of R.sub.a1, R.sub.b1, R.sub.c1, R.sub.d1, R.sub.a, R.sub.b, R.sub.c, R.sub.d, R.sub.e, and R.sub.f is independently a hydrogen or a substituent selected from the group consisting of deuterium, halide, alkyl, cycloalkyl, heteroalkyl, arylalkyl, alkoxy, aryloxy, amino, silyl, germyl, boryl, alkenyl, cycloalkenyl, heteroalkenyl, alkynyl, aryl, heteroaryl, acyl, carbonyl, carboxylic acid, ester, nitrile, isonitrile, sulfanyl, selenyl, sulfinyl, sulfonyl, phosphino, and combinations thereof; and [0207] any two substituents of R.sub.a1, R.sub.b1, R.sub.c1, R.sub.d1, R.sub.a, R.sub.b, R.sub.c, R.sub.d, R.sub.e, and R.sub.f can be fused or joined to form a ring or form a multidentate ligand.
[0208] In some embodiments, L.sub.B and L.sub.c are each independently selected from the group consisting of the structures of the following LIST 7:
##STR00271## ##STR00272## ##STR00273## ##STR00274## ##STR00275## ##STR00276## ##STR00277## ##STR00278## ##STR00279## ##STR00280## ##STR00281## ##STR00282## ##STR00283## ##STR00284## ##STR00285##
[0209] wherein: [0210] R.sub.a′, R.sub.b′, R.sub.c′, R.sub.d′, and R.sub.e′ each independently represents zero, mono, or up to a maximum allowed number of substitution to its associated ring; [0211] R.sub.a′, R.sub.b′, R.sub.c′, R.sub.d′, and R.sub.e′ each independently hydrogen or a substituent selected from the group consisting of deuterium, halide, alkyl, cycloalkyl, heteroalkyl, arylalkyl, alkoxy, aryloxy, amino, silyl, germyl, boryl, alkenyl, cycloalkenyl, heteroalkenyl, alkynyl, aryl, heteroaryl, acyl, carbonyl, carboxylic acid, ester, nitrile, isonitrile, sulfanyl, selenyl, sulfinyl, sulfonyl, phosphino, and combinations thereof; and two substituents of R.sub.a′, R.sub.b′, R.sub.c′, R.sub.d′, and R.sub.e′ can be fused or joined to form a ring or form a multidentate ligand.

[0212] In some embodiments, L.sub.B comprises a structure of
##STR00286##
wherein the variables are the same as previously defined. In some embodiments, each of Y.sup.1 to Y.sup.4 is independently carbon. In some embodiments, at least one of Y.sup.1 to Y.sup.4 is N. In some embodiments, exactly one of Y.sup.1 to Y.sup.4 is N. In some embodiments, Y.sup.1 is N. In some embodiments, Y.sup.2 is N. In some embodiments, Y.sup.3 is N. In some embodiments, Y.sup.4 is N. In some embodiments, at least one of R.sub.a is a tertiary alkyl, silyl or germyl. In some embodiments, at least one of R.sub.a is a tertiary alkyl. In some embodiments, Y.sup.3 is C and the R.sub.a attached thereto is a tertiary alkyl, silyl or germyl. In some embodiments, Y.sup.1 to Y.sup.3 is C, Y.sup.4 is N, and the R.sub.a attached to Y.sup.3 is a tertiary alkyl, silyl or germyl. In some embodiments, Y.sup.1 to Y.sup.3 is C, Y.sup.4 is N, and the R.sub.a attached to Y.sup.2 is a tertiary alkyl, silyl or germyl. In some embodiments, at least one of R.sub.b is a tertiary alkyl, silyl, or germyl. In some embodiments, the tertiary alkyl is tert-butyl. In some embodiments, at least one pair of R.sub.a and R.sub.b are joined or fused to form a ring.
[0213] In some embodiments, the compound has formula Ir(L.sub.A).sub.3, formula Ir(L.sub.A)(L.sub.Bk).sub.2, formula Ir(L.sub.A).sub.2 (L.sub.Bk), formula Ir(L.sub.A).sub.2 (L.sub.Cj-I), or Ir(L.sub.A).sub.2 (L.sub.Cj-II), [0214] wherein L.sub.A can be any embodiment described herein, including L.sub.A1 (R.sub.66) (R.sub.1) (R.sub.1) (R.sub.1) (R.sub.1) (R.sub.1) to L.sub.A152 (R.sub.295) (R.sub.295) (R.sub.295) (R.sub.295) (R.sub.295); [0215] wherein k is an integer from 1 to 541, and each L.sub.Bk has the structure defined in the following LIST 8:
##STR00287## ##STR00288## ##STR00289## ##STR00290## ##STR00291## ##STR00292## ##STR00293## ##STR00294## ##STR00295## ##STR00296## ##STR00297## ##STR00298## ##STR00299## ##STR00300## ##STR00301## ##STR00302## ##STR00303## ##STR00304## ##STR00305## ##STR00306## ##STR00307## ##STR00308## ##STR00309## ##STR00310## ##STR00311## ##STR00312## ##STR00313## ##STR00314## ##STR00315## ##STR00316## ##STR00317## ##STR00318## ##STR00319## ##STR00320## ##STR00321## ##STR00322## ##STR00323## ##STR00324## ##STR00325## ##STR00326## ##STR00327## ##STR00328## ##STR00329## ##STR00330## ##STR00331## ##STR00332## ##STR00333## ##STR00334## ##STR00335## ##STR00336## ##STR00337## ##STR00338## ##STR00339## ##STR00340## ##STR00341## ##STR00342## ##STR00343## ##STR00344##
##STR00345## ##STR00346## ##STR00347## ##STR00348## ##STR00349## ##STR00350## ##STR00351## ##STR00352## ##STR00353## ##STR00354## ##STR00355## ##STR00356## ##STR00357## ##STR00358## ##STR00359## ##STR00360## ##STR00361## ##STR00362## ##STR00363## ##STR00364## ##STR00365## ##STR00366## ##STR00367## ##STR00368## ##STR00369## ##STR00370## ##STR00371## ##STR00372## ##STR00373## ##STR00374## ##STR00375## ##STR00376## ##STR00377## ##STR00378## ##STR00379## ##STR00380## ##STR00381## ##STR00382## ##STR00383## ##STR00384## ##STR00385## ##STR00386## ##STR00387## ##STR00388## ##STR00389## ##STR00390## ##STR00391## ##STR00392## ##STR00393## ##STR00394## ##STR00395## ##STR00396## ##STR00397## ##STR00398## ##STR00399## ##STR00400## ##STR00401## ##STR00402## ##STR00403## ##STR00404## ##STR00405## ##STR00406##
##STR00407## ##STR00408## ##STR00409## ##STR00410## ##STR00411## ##STR00412## ##STR00413## ##STR00414## ##STR00415##
[0216] wherein each L.sub.cy-I has a structure based on formula
##STR00416##
and
[0217] each L.sub.cj-II has a structure based on formula
##STR00417##
wherein for each L.sub.cj in L.sub.cj-I and L.sub.cj-II, R.sup.201 and R.sup.202 have the structures defined in the following LIST 9:

TABLE-US-00003 L.sub.Cj R.sup.201 R.sup.202 L.sub.Cj R.sup.201 R.sup.202 L.sub.Cj R.sup.201 R.sup.202 L.sub.Cj R.sup.201 R.sup.202 L.sub.C1 R.sup.D1 R.sup.D1 L.sub.C193 R.sup.D1 R.sup.D3 L.sub.C385 R.sup.D17 R.sup.D40 L.sub.C577 R.sup.D143 R.sup.D120 L.sub.C2 R.sup.D2 R.sup.D2 L.sub.C194 R.sup.D1 R.sup.D4 L.sub.C386 R.sup.D17 R.sup.D41 L.sub.C578 R.sup.D143 R.sup.D133 L.sub.C3 R.sup.D3 R.sup.D3 L.sub.C195 R.sup.D1 R.sup.D5 L.sub.C387 R.sup.D17 R.sup.D42 L.sub.C579 R.sup.D143 R.sup.D134 L.sub.C4 R.sup.D4 R.sup.D4 L.sub.C196 R.sup.D1 R.sup.D9 L.sub.C388 R.sup.D17 R.sup.D43 L.sub.C580 R.sup.D143 R.sup.D135 L.sub.C5 R.sup.D5 R.sup.D5 L.sub.C197 R.sup.D1 R.sup.D10 L.sub.C389 R.sup.D17 R.sup.D48 L.sub.C581 R.sup.D143 R.sup.D136 L.sub.C6 R.sup.D6 R.sup.D6 L.sub.C198 R.sup.D1 R.sup.D17 L.sub.C390 R.sup.D17 R.sup.D49 L.sub.C582 R.sup.D143 R.sup.D144 L.sub.C7 R.sup.D7 R.sup.D7 L.sub.C199 R.sup.D1 R.sup.D18 L.sub.C391 R.sup.D17 R.sup.D50 L.sub.C583 R.sup.D143 R.sup.D145 L.sub.C8 R.sup.D8 R.sup.D8 L.sub.C200 R.sup.D1 R.sup.D20 L.sub.C392 R.sup.D17 R.sup.D54 L.sub.C584 R.sup.D143 R.sup.D146 L.sub.C9 R.sup.D9 R.sup.D9 L.sub.C201 R.sup.D1 R.sup.D22 L.sub.C393 R.sup.D17 R.sup.D55 L.sub.C585 R.sup.D143 R.sup.D147 L.sub.C10 R.sup.D10 R.sup.D10 L.sub.C202 R.sup.D1 R.sup.D37 L.sub.C394 R.sup.D17 R.sup.D58 L.sub.C586 R.sup.D143 R.sup.D149 L.sub.C11 R.sup.D11 R.sup.D11 L.sub.C203 R.sup.D1 R.sup.D40 L.sub.C395 R.sup.D17 R.sup.D59 L.sub.C587 R.sup.D143 R.sup.D151 L.sub.C12 R.sup.D12 R.sup.D12 L.sub.C204 R.sup.D1 R.sup.D41 L.sub.C396 R.sup.D17 R.sup.D78 L.sub.C588 R.sup.D143 R.sup.D154 L.sub.C13 R.sup.D13 R.sup.D13 L.sub.C205 R.sup.D1 R.sup.D42 L.sub.C397 R.sup.D17 R.sup.D79 L.sub.C589 R.sup.D143 R.sup.D155 L.sub.C14 R.sup.D14 R.sup.D14 L.sub.C206 R.sup.D1 R.sup.D43 L.sub.C398 R.sup.D17 R.sup.D81 L.sub.C590 R.sup.D143 R.sup.D161 L.sub.C15 R.sup.D15 R.sup.D15 L.sub.C207 R.sup.D1 R.sup.D48 L.sub.C399 R.sup.D17 R.sup.D87 L.sub.C591 R.sup.D143 R.sup.D175 L.sub.C16 R.sup.D16 R.sup.D16 L.sub.C208 R.sup.D1 R.sup.D49 L.sub.C400 R.sup.D17 R.sup.D88 L.sub.C592 R.sup.D144 R.sup.D3 L.sub.C17 R.sup.D17 R.sup.D17 L.sub.C209 R.sup.D1 R.sup.D50 L.sub.C401 R.sup.D17 R.sup.D89 L.sub.C593 R.sup.D144 R.sup.D5 L.sub.C18 R.sup.D18 R.sup.D18 L.sub.C210 R.sup.D1 R.sup.D54 L.sub.C402 R.sup.D17 R.sup.D93 L.sub.C594 R.sup.D144 R.sup.D17 L.sub.C19 R.sup.D19 R.sup.D19 L.sub.C211 R.sup.D1 R.sup.D55 L.sub.C403 R.sup.D17 R.sup.D116 L.sub.C595 R.sup.D144 R.sup.D18 L.sub.C20 R.sup.D20 R.sup.D20 L.sub.C212 R.sup.D1 R.sup.D58 L.sub.C404 R.sup.D17 R.sup.D117 L.sub.C596 R.sup.D144 R.sup.D20 L.sub.C21 R.sup.D21 R.sup.D21 L.sub.C213 R.sup.D1 R.sup.D59 L.sub.C405 R.sup.D17 R.sup.D118 L.sub.C597 R.sup.D144 R.sup.D22 L.sub.C22 R.sup.D22 R.sup.D22 L.sub.C214 R.sup.D1 R.sup.D78 L.sub.C406 R.sup.D17 R.sup.D119 L.sub.C598 R.sup.D144 R.sup.D37 L.sub.C23 R.sup.D23 R.sup.D23 L.sub.C215 R.sup.D1 R.sup.D79 L.sub.C407 R.sup.D17 R.sup.D120 L.sub.C599 R.sup.D144 R.sup.D40 L.sub.C24 R.sup.D24 R.sup.D24 L.sub.C216 R.sup.D1 R.sup.D81 L.sub.C408 R.sup.D17 R.sup.D133 L.sub.C600 R.sup.D144 R.sup.D41 L.sub.C25 R.sup.D25 R.sup.D25 L.sub.C217 R.sup.D1 R.sup.D87 L.sub.C409 R.sup.D17 R.sup.D134 L.sub.C601 R.sup.D144 R.sup.D42 L.sub.C26 R.sup.D26 R.sup.D26 L.sub.C218 R.sup.D1 R.sup.D88 L.sub.C410 R.sup.D17 R.sup.D135 L.sub.C602 R.sup.D144 R.sup.D43 L.sub.C27 R.sup.D27 R.sup.D27 L.sub.C219 R.sup.D1 R.sup.D89 L.sub.C411 R.sup.D17 R.sup.D136 L.sub.C603 R.sup.D144 R.sup.D48 L.sub.C28 R.sup.D28 R.sup.D28 L.sub.C220 R.sup.D1 R.sup.D93 L.sub.C412 R.sup.D17 R.sup.D143 L.sub.C604 R.sup.D144 R.sup.D49 L.sub.C29 R.sup.D29 R.sup.D29 L.sub.C221 R.sup.D1 R.sup.D116 L.sub.C413 R.sup.D17 R.sup.D144 L.sub.C605 R.sup.D144 R.sup.D54 L.sub.C30 R.sup.D30 R.sup.D30 L.sub.C222 R.sup.D1 R.sup.D117 L.sub.C414 R.sup.D17 R.sup.D145 L.sub.C606 R.sup.D144 R.sup.D58 L.sub.C31 R.sup.D31 R.sup.D31 L.sub.C223 R.sup.D1 R.sup.D118 L.sub.C415 R.sup.D17 R.sup.D146 L.sub.C607 R.sup.D144 R.sup.D59 L.sub.C32 R.sup.D32 R.sup.D32 L.sub.C224 R.sup.D1 R.sup.D119 L.sub.C416 R.sup.D17 R.sup.D147 L.sub.C608 R.sup.D144 R.sup.D78 L.sub.C33 R.sup.D33 R.sup.D33 L.sub.C225 R.sup.D1 R.sup.D120

L.sub.C417 R.sup.D17 R.sup.D149 L.sub.C609 R.sup.D144 R.sup.D79 L.sub.C34 R.sup.D34
R.sup.D34 L.sub.C226 R.sup.D1 R.sup.D133 L.sub.C418 R.sup.D17 R.sup.D151 L.sub.C610
R.sup.D144 R.sup.D81 L.sub.C35 R.sup.D35 R.sup.D35 L.sub.C227 R.sup.D1 R.sup.D134
L.sub.C419 R.sup.D17 R.sup.D154 L.sub.C611 R.sup.D144 R.sup.D87 L.sub.C36 R.sup.D36
R.sup.D36 L.sub.C228 R.sup.D1 R.sup.D135 L.sub.C420 R.sup.D17 R.sup.D155 L.sub.C612
R.sup.D144 R.sup.D88 L.sub.C37 R.sup.D37 R.sup.D37 L.sub.C229 R.sup.D1 R.sup.D136
L.sub.C421 R.sup.D17 R.sup.D161 L.sub.C613 R.sup.D144 R.sup.D89 L.sub.C38 R.sup.D38
R.sup.D38 L.sub.C230 R.sup.D1 R.sup.D143 L.sub.C422 R.sup.D17 R.sup.D175 L.sub.C614
R.sup.D144 R.sup.D93 L.sub.C39 R.sup.D39 R.sup.D39 L.sub.C231 R.sup.D1 R.sup.D144
L.sub.C423 R.sup.D50 R.sup.D3 L.sub.C615 R.sup.D144 R.sup.D116 L.sub.C40 R.sup.D40
R.sup.D40 L.sub.C232 R.sup.D1 R.sup.D145 L.sub.C424 R.sup.D50 R.sup.D5 L.sub.C616
R.sup.D144 R.sup.D117 L.sub.C41 R.sup.D41 R.sup.D41 L.sub.C233 R.sup.D1 R.sup.D146
L.sub.C425 R.sup.D50 R.sup.D18 L.sub.C617 R.sup.D144 R.sup.D118 L.sub.C42 R.sup.D42
R.sup.D42 L.sub.C234 R.sup.D1 R.sup.D147 L.sub.C426 R.sup.D50 R.sup.D20 L.sub.C618
R.sup.D144 R.sup.D119 L.sub.C43 R.sup.D43 R.sup.D43 L.sub.C235 R.sup.D1 R.sup.D149
L.sub.C427 R.sup.D50 R.sup.D22 L.sub.C619 R.sup.D144 R.sup.D120 L.sub.C44 R.sup.D44
R.sup.D44 L.sub.C236 R.sup.D1 R.sup.D151 L.sub.C428 R.sup.D50 R.sup.D37 L.sub.C620
R.sup.D144 R.sup.D133 L.sub.C45 R.sup.D45 R.sup.D45 L.sub.C237 R.sup.D1 R.sup.D154
L.sub.C429 R.sup.D50 R.sup.D40 L.sub.C621 R.sup.D144 R.sup.D134 L.sub.C46 R.sup.D46
R.sup.D46 L.sub.C238 R.sup.D1 R.sup.D155 L.sub.C430 R.sup.D50 R.sup.D41 L.sub.C622
R.sup.D144 R.sup.D135 L.sub.C47 R.sup.D47 R.sup.D47 L.sub.C239 R.sup.D1 R.sup.D161
L.sub.C431 R.sup.D50 R.sup.D42 L.sub.C623 R.sup.D144 R.sup.D136 L.sub.C48 R.sup.D48
R.sup.D48 L.sub.C240 R.sup.D1 R.sup.D175 L.sub.C432 R.sup.D50 R.sup.D43 L.sub.C624
R.sup.D144 R.sup.D145 L.sub.C49 R.sup.D49 R.sup.D49 L.sub.C241 R.sup.D4 R.sup.D3
L.sub.C433 R.sup.D50 R.sup.D48 L.sub.C625 R.sup.D144 R.sup.D146 L.sub.C50 R.sup.D50
R.sup.D50 L.sub.C242 R.sup.D4 R.sup.D5 L.sub.C434 R.sup.D50 R.sup.D49 L.sub.C626
R.sup.D144 R.sup.D147 L.sub.C51 R.sup.D51 R.sup.D51 L.sub.C243 R.sup.D4 R.sup.D9
L.sub.C435 R.sup.D50 R.sup.D54 L.sub.C627 R.sup.D144 R.sup.D149 L.sub.C52 R.sup.D52
R.sup.D52 L.sub.C244 R.sup.D4 R.sup.D10 L.sub.C436 R.sup.D50 R.sup.D55 L.sub.C628
R.sup.D144 R.sup.D151 L.sub.C53 R.sup.D53 R.sup.D53 L.sub.C245 R.sup.D4 R.sup.D17
L.sub.C437 R.sup.D50 R.sup.D58 L.sub.C629 R.sup.D144 R.sup.D154 L.sub.C54 R.sup.D54
R.sup.D54 L.sub.C246 R.sup.D4 R.sup.D18 L.sub.C438 R.sup.D50 R.sup.D59 L.sub.C630
R.sup.D144 R.sup.D155 L.sub.C55 R.sup.D55 R.sup.D55 L.sub.C247 R.sup.D4 R.sup.D20
L.sub.C439 R.sup.D50 R.sup.D78 L.sub.C631 R.sup.D144 R.sup.D161 L.sub.C56 R.sup.D56
R.sup.D56 L.sub.C248 R.sup.D4 R.sup.D22 L.sub.C440 R.sup.D50 R.sup.D79 L.sub.C632
R.sup.D144 R.sup.D175 L.sub.C57 R.sup.D57 R.sup.D57 L.sub.C249 R.sup.D4 R.sup.D37
L.sub.C441 R.sup.D50 R.sup.D81 L.sub.C633 R.sup.D145 R.sup.D3 L.sub.C58 R.sup.D58
R.sup.D58 L.sub.C250 R.sup.D4 R.sup.D40 L.sub.C442 R.sup.D50 R.sup.D87 L.sub.C634
R.sup.D145 R.sup.D5 L.sub.C59 R.sup.D59 R.sup.D59 L.sub.C251 R.sup.D4 R.sup.D41
L.sub.C443 R.sup.D50 R.sup.D88 L.sub.C635 R.sup.D145 R.sup.D17 L.sub.C60 R.sup.D60
R.sup.D60 L.sub.C252 R.sup.D4 R.sup.D42 L.sub.C444 R.sup.D50 R.sup.D89 L.sub.C636
R.sup.D145 R.sup.D18 L.sub.C61 R.sup.D61 R.sup.D61 L.sub.C253 R.sup.D4 R.sup.D43
L.sub.C445 R.sup.D50 R.sup.D93 L.sub.C637 R.sup.D145 R.sup.D20 L.sub.C62 R.sup.D62
R.sup.D62 L.sub.C254 R.sup.D4 R.sup.D48 L.sub.C446 R.sup.D50 R.sup.D116 L.sub.C638
R.sup.D145 R.sup.D22 L.sub.C63 R.sup.D63 R.sup.D63 L.sub.C255 R.sup.D4 R.sup.D49
L.sub.C447 R.sup.D50 R.sup.D117 L.sub.C639 R.sup.D145 R.sup.D37 L.sub.C64 R.sup.D64
R.sup.D64 L.sub.C256 R.sup.D4 R.sup.D50 L.sub.C448 R.sup.D50 R.sup.D118 L.sub.C640
R.sup.D145 R.sup.D40 L.sub.C65 R.sup.D65 R.sup.D65 L.sub.C257 R.sup.D4 R.sup.D54
L.sub.C449 R.sup.D50 R.sup.D119 L.sub.C641 R.sup.D145 R.sup.D41 L.sub.C66 R.sup.D66
R.sup.D66 L.sub.C258 R.sup.D4 R.sup.D55 L.sub.C450 R.sup.D50 R.sup.D120 L.sub.C642

R.sup.D145 R.sup.D42 L.sub.C67 R.sup.D67 R.sup.D67 L.sub.C259 R.sup.D4 R.sup.D58
L.sub.C451 R.sup.D50 R.sup.D133 L.sub.C643 R.sup.D145 R.sup.D43 L.sub.C68 R.sup.D68
R.sup.D68 L.sub.C260 R.sup.D4 R.sup.D59 L.sub.C452 R.sup.D50 R.sup.D134 L.sub.C644
R.sup.D145 R.sup.D48 L.sub.C69 R.sup.D69 R.sup.D69 L.sub.C261 R.sup.D4 R.sup.D78
L.sub.C453 R.sup.D50 R.sup.D135 L.sub.C645 R.sup.D145 R.sup.D49 L.sub.C70 R.sup.D70
R.sup.D70 L.sub.C262 R.sup.D4 R.sup.D79 L.sub.C454 R.sup.D50 R.sup.D136 L.sub.C646
R.sup.D145 R.sup.D54 L.sub.C71 R.sup.D71 R.sup.D71 L.sub.C263 R.sup.D4 R.sup.D81
L.sub.C455 R.sup.D50 R.sup.D143 L.sub.C647 R.sup.D145 R.sup.D58 L.sub.C72 R.sup.D72
R.sup.D72 L.sub.C264 R.sup.D4 R.sup.D87 L.sub.C456 R.sup.D50 R.sup.D144 L.sub.C648
R.sup.D145 R.sup.D59 L.sub.C73 R.sup.D73 R.sup.D73 L.sub.C265 R.sup.D4 R.sup.D88
L.sub.C457 R.sup.D50 R.sup.D145 L.sub.C649 R.sup.D145 R.sup.D78 L.sub.C74 R.sup.D74
R.sup.D74 L.sub.C266 R.sup.D4 R.sup.D89 L.sub.C458 R.sup.D50 R.sup.D146 L.sub.C650
R.sup.D145 R.sup.D79 L.sub.C75 R.sup.D75 R.sup.D75 L.sub.C267 R.sup.D4 R.sup.D93
L.sub.C459 R.sup.D50 R.sup.D147 L.sub.C651 R.sup.D145 R.sup.D81 L.sub.C76 R.sup.D76
R.sup.D76 L.sub.C268 R.sup.D4 R.sup.D116 L.sub.C460 R.sup.D50 R.sup.D149 L.sub.C652
R.sup.D145 R.sup.D87 L.sub.C77 R.sup.D77 R.sup.D77 L.sub.C269 R.sup.D4 R.sup.D117
L.sub.C461 R.sup.D50 R.sup.D151 L.sub.C653 R.sup.D145 R.sup.D88 L.sub.C78 R.sup.D78
R.sup.D78 L.sub.C270 R.sup.D4 R.sup.D118 L.sub.C462 R.sup.D50 R.sup.D154 L.sub.C654
R.sup.D145 R.sup.D89 L.sub.C79 R.sup.D79 R.sup.D79 L.sub.C271 R.sup.D4 R.sup.D119
L.sub.C463 R.sup.D50 R.sup.D155 L.sub.C655 R.sup.D145 R.sup.D93 L.sub.C80 R.sup.D80
R.sup.D80 L.sub.C272 R.sup.D4 R.sup.D120 L.sub.C464 R.sup.D50 R.sup.D161 L.sub.C656
R.sup.D145 R.sup.D116 L.sub.C81 R.sup.D81 R.sup.D81 L.sub.C273 R.sup.D4 R.sup.D133
L.sub.C465 R.sup.D50 R.sup.D175 L.sub.C657 R.sup.D145 R.sup.D117 L.sub.C82 R.sup.D82
R.sup.D82 L.sub.C274 R.sup.D4 R.sup.D134 L.sub.C466 R.sup.D55 R.sup.D3 L.sub.C658
R.sup.D145 R.sup.D118 L.sub.C83 R.sup.D83 R.sup.D83 L.sub.C275 R.sup.D4 R.sup.D135
L.sub.C467 R.sup.D55 R.sup.D5 L.sub.C659 R.sup.D145 R.sup.D119 L.sub.C84 R.sup.D84
R.sup.D84 L.sub.C276 R.sup.D4 R.sup.D136 L.sub.C468 R.sup.D55 R.sup.D18 L.sub.C660
R.sup.D145 R.sup.D120 L.sub.C85 R.sup.D85 R.sup.D85 L.sub.C277 R.sup.D4 R.sup.D143
L.sub.C469 R.sup.D55 R.sup.D20 L.sub.C661 R.sup.D145 R.sup.D133 L.sub.C86 R.sup.D86
R.sup.D86 L.sub.C278 R.sup.D4 R.sup.D144 L.sub.C470 R.sup.D55 R.sup.D22 L.sub.C662
R.sup.D145 R.sup.D134 L.sub.C87 R.sup.D87 R.sup.D87 L.sub.C279 R.sup.D4 R.sup.D145
L.sub.C471 R.sup.D55 R.sup.D37 L.sub.C663 R.sup.D145 R.sup.D135 L.sub.C88 R.sup.D88
R.sup.D88 L.sub.C280 R.sup.D4 R.sup.D146 L.sub.C472 R.sup.D55 R.sup.D40 L.sub.C664
R.sup.D145 R.sup.D136 L.sub.C89 R.sup.D89 R.sup.D89 L.sub.C281 R.sup.D4 R.sup.D147
L.sub.C473 R.sup.D55 R.sup.D41 L.sub.C665 R.sup.D145 R.sup.D146 L.sub.C90 R.sup.D90
R.sup.D90 L.sub.C282 R.sup.D4 R.sup.D149 L.sub.C474 R.sup.D55 R.sup.D42 L.sub.C666
R.sup.D145 R.sup.D147 L.sub.C91 R.sup.D91 R.sup.D91 L.sub.C283 R.sup.D4 R.sup.D151
L.sub.C475 R.sup.D55 R.sup.D43 L.sub.C667 R.sup.D145 R.sup.D149 L.sub.C92 R.sup.D92
R.sup.D92 L.sub.C284 R.sup.D4 R.sup.D154 L.sub.C476 R.sup.D55 R.sup.D48 L.sub.C668
R.sup.D145 R.sup.D151 L.sub.C93 R.sup.D93 R.sup.D93 L.sub.C285 R.sup.D4 R.sup.D155
L.sub.C477 R.sup.D55 R.sup.D49 L.sub.C669 R.sup.D145 R.sup.D154 L.sub.C94 R.sup.D94
R.sup.D94 L.sub.C286 R.sup.D4 R.sup.D161 L.sub.C478 R.sup.D55 R.sup.D54 L.sub.C670
R.sup.D145 R.sup.D155 L.sub.C95 R.sup.D95 R.sup.D95 L.sub.C287 R.sup.D4 R.sup.D175
L.sub.C479 R.sup.D55 R.sup.D58 L.sub.C671 R.sup.D145 R.sup.D161 L.sub.C96 R.sup.D96
R.sup.D96 L.sub.C288 R.sup.D9 R.sup.D3 L.sub.C480 R.sup.D55 R.sup.D59 L.sub.C672
R.sup.D145 R.sup.D175 L.sub.C97 R.sup.D97 R.sup.D97 L.sub.C289 R.sup.D9 R.sup.D5
L.sub.C481 R.sup.D55 R.sup.D78 L.sub.C673 R.sup.D146 R.sup.D3 L.sub.C98 R.sup.D98
R.sup.D98 L.sub.C290 R.sup.D9 R.sup.D10 L.sub.C482 R.sup.D55 R.sup.D79 L.sub.C674
R.sup.D146 R.sup.D5 L.sub.C99 R.sup.D99 R.sup.D99 L.sub.C291 R.sup.D9 R.sup.D17
L.sub.C483 R.sup.D55 R.sup.D81 L.sub.C675 R.sup.D146 R.sup.D17 L.sub.C100 R.sup.D100

R.sup.D100 L.sub.C292 R.sup.D9 R.sup.D18 L.sub.C484 R.sup.D55 R.sup.D87 L.sub.C676
R.sup.D146 R.sup.D18 L.sub.C101 R.sup.D101 R.sup.D101 L.sub.C293 R.sup.D9 R.sup.D20
L.sub.C485 R.sup.D55 R.sup.D88 L.sub.C677 R.sup.D146 R.sup.D20 L.sub.C102 R.sup.D102
R.sup.D102 L.sub.C294 R.sup.D9 R.sup.D22 L.sub.C486 R.sup.D55 R.sup.D89 L.sub.C678
R.sup.D146 R.sup.D22 L.sub.C103 R.sup.D103 R.sup.D103 L.sub.C295 R.sup.D9 R.sup.D37
L.sub.C487 R.sup.D55 R.sup.D93 L.sub.C679 R.sup.D146 R.sup.D37 L.sub.C104 R.sup.D104
R.sup.D104 L.sub.C296 R.sup.D9 R.sup.D40 L.sub.C488 R.sup.D55 R.sup.D116 L.sub.C680
R.sup.D146 R.sup.D40 L.sub.C105 R.sup.D105 R.sup.D105 L.sub.C297 R.sup.D9 R.sup.D41
L.sub.C489 R.sup.D55 R.sup.D117 L.sub.C681 R.sup.D146 R.sup.D41 L.sub.C106 R.sup.D106
R.sup.D106 L.sub.C298 R.sup.D9 R.sup.D42 L.sub.C490 R.sup.D55 R.sup.D118 L.sub.C682
R.sup.D146 R.sup.D42 L.sub.C107 R.sup.D107 R.sup.D107 L.sub.C299 R.sup.D9 R.sup.D43
L.sub.C491 R.sup.D55 R.sup.D119 L.sub.C683 R.sup.D146 R.sup.D43 L.sub.C108 R.sup.D108
R.sup.D108 L.sub.C300 R.sup.D9 R.sup.D48 L.sub.C492 R.sup.D55 R.sup.D120 L.sub.C684
R.sup.D146 R.sup.D48 L.sub.C109 R.sup.D109 R.sup.D109 L.sub.C301 R.sup.D9 R.sup.D49
L.sub.C493 R.sup.D55 R.sup.D133 L.sub.C685 R.sup.D146 R.sup.D49 L.sub.C110 R.sup.D110
R.sup.D110 L.sub.C302 R.sup.D9 R.sup.D50 L.sub.C494 R.sup.D55 R.sup.D134 L.sub.C686
R.sup.D146 R.sup.D54 L.sub.C111 R.sup.D111 R.sup.D111 L.sub.C303 R.sup.D9 R.sup.D54
L.sub.C495 R.sup.D55 R.sup.D135 L.sub.C687 R.sup.D146 R.sup.D58 L.sub.C112 R.sup.D112
R.sup.D112 L.sub.C304 R.sup.D9 R.sup.D55 L.sub.C496 R.sup.D55 R.sup.D136 L.sub.C688
R.sup.D146 R.sup.D59 L.sub.C113 R.sup.D113 R.sup.D113 L.sub.C305 R.sup.D9 R.sup.D58
L.sub.C497 R.sup.D55 R.sup.D143 L.sub.C689 R.sup.D146 R.sup.D78 L.sub.C114 R.sup.D114
R.sup.D114 L.sub.C306 R.sup.D9 R.sup.D59 L.sub.C498 R.sup.D55 R.sup.D144 L.sub.C690
R.sup.D146 R.sup.D79 L.sub.C115 R.sup.D115 R.sup.D115 L.sub.C307 R.sup.D9 R.sup.D78
L.sub.C499 R.sup.D55 R.sup.D145 L.sub.C691 R.sup.D146 R.sup.D81 L.sub.C116 R.sup.D116
R.sup.D116 L.sub.C308 R.sup.D9 R.sup.D79 L.sub.C500 R.sup.D55 R.sup.D146 L.sub.C692
R.sup.D146 R.sup.D87 L.sub.C117 R.sup.D117 R.sup.D117 L.sub.C309 R.sup.D9 R.sup.D81
L.sub.C501 R.sup.D55 R.sup.D147 L.sub.C693 R.sup.D146 R.sup.D88 L.sub.C118 R.sup.D118
R.sup.D118 L.sub.C310 R.sup.D9 R.sup.D87 L.sub.C502 R.sup.D55 R.sup.D149 L.sub.C694
R.sup.D146 R.sup.D89 L.sub.C119 R.sup.D119 R.sup.D119 L.sub.C311 R.sup.D9 R.sup.D88
L.sub.C503 R.sup.D55 R.sup.D151 L.sub.C695 R.sup.D146 R.sup.D93 L.sub.C120 R.sup.D120
R.sup.D120 L.sub.C312 R.sup.D9 R.sup.D89 L.sub.C504 R.sup.D55 R.sup.D154 L.sub.C696
R.sup.D146 R.sup.D117 L.sub.C121 R.sup.D121 R.sup.D121 L.sub.C313 R.sup.D9 R.sup.D93
L.sub.C505 R.sup.D55 R.sup.D155 L.sub.C697 R.sup.D146 R.sup.D118 L.sub.C122 R.sup.D122
R.sup.D122 L.sub.C314 R.sup.D9 R.sup.D116 L.sub.C506 R.sup.D55 R.sup.D161 L.sub.C698
R.sup.D146 R.sup.D119 L.sub.C123 R.sup.D123 R.sup.D123 L.sub.C315 R.sup.D9 R.sup.D117
L.sub.C507 R.sup.D55 R.sup.D175 L.sub.C699 R.sup.D146 R.sup.D120 L.sub.C124 R.sup.D124
R.sup.D124 L.sub.C316 R.sup.D9 R.sup.D118 L.sub.C508 R.sup.D116 R.sup.D3 L.sub.C700
R.sup.D146 R.sup.D133 L.sub.C125 R.sup.D125 R.sup.D125 L.sub.C317 R.sup.D9 R.sup.D119
L.sub.C509 R.sup.D116 R.sup.D5 L.sub.C701 R.sup.D146 R.sup.D134 L.sub.C126 R.sup.D126
R.sup.D126 L.sub.C318 R.sup.D9 R.sup.D120 L.sub.C510 R.sup.D116 R.sup.D17 L.sub.C702
R.sup.D146 R.sup.D135 L.sub.C127 R.sup.D127 R.sup.D127 L.sub.C319 R.sup.D9 R.sup.D133
L.sub.C511 R.sup.D116 R.sup.D18 L.sub.C703 R.sup.D146 R.sup.D136 L.sub.C128 R.sup.D128
R.sup.D128 L.sub.C320 R.sup.D9 R.sup.D134 L.sub.C512 R.sup.D116 R.sup.D20 L.sub.C704
R.sup.D146 R.sup.D146 L.sub.C129 R.sup.D129 R.sup.D129 L.sub.C321 R.sup.D9 R.sup.D135
L.sub.C513 R.sup.D116 R.sup.D22 L.sub.C705 R.sup.D146 R.sup.D147 L.sub.C130 R.sup.D130
R.sup.D130 L.sub.C322 R.sup.D9 R.sup.D136 L.sub.C514 R.sup.D116 R.sup.D37 L.sub.C706
R.sup.D146 R.sup.D149 L.sub.C131 R.sup.D131 R.sup.D131 L.sub.C323 R.sup.D9 R.sup.D143
L.sub.C515 R.sup.D116 R.sup.D40 L.sub.C707 R.sup.D146 R.sup.D151 L.sub.C132 R.sup.D132
R.sup.D132 L.sub.C324 R.sup.D9 R.sup.D144 L.sub.C516 R.sup.D116 R.sup.D41 L.sub.C708
R.sup.D146 R.sup.D154 L.sub.C133 R.sup.D133 R.sup.D133 L.sub.C325 R.sup.D9 R.sup.D145

L.sub.C517 R.sup.D116 R.sup.D42 L.sub.C709 R.sup.D146 R.sup.D155 L.sub.C134 R.sup.D134
R.sup.D134 L.sub.C326 R.sup.D9 R.sup.D146 L.sub.C518 R.sup.D116 R.sup.D43 L.sub.C710
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L.sub.C519 R.sup.D116 R.sup.D48 L.sub.C711 R.sup.D146 R.sup.D175 L.sub.C136 R.sup.D136
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L.sub.C523 R.sup.D116 R.sup.D59 L.sub.C715 R.sup.D133 R.sup.D18 L.sub.C140 R.sup.D140
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L.sub.C525 R.sup.D116 R.sup.D79 L.sub.C717 R.sup.D133 R.sup.D22 L.sub.C142 R.sup.D142
R.sup.D142 L.sub.C334 R.sup.D10 R.sup.D3 L.sub.C526 R.sup.D116 R.sup.D81 L.sub.C718
R.sup.D133 R.sup.D37 L.sub.C143 R.sup.D143 R.sup.D143 L.sub.C335 R.sup.D10 R.sup.D5
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R.sup.D148 L.sub.C340 R.sup.D10 R.sup.D37 L.sub.C532 R.sup.D116 R.sup.D118 L.sub.C724
R.sup.D133 R.sup.D49 L.sub.C149 R.sup.D149 R.sup.D149 L.sub.C341 R.sup.D10 R.sup.D40
L.sub.C533 R.sup.D116 R.sup.D119 L.sub.C725 R.sup.D133 R.sup.D54 L.sub.C150 R.sup.D150
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R.sup.D152 L.sub.C344 R.sup.D10 R.sup.D43 L.sub.C536 R.sup.D116 R.sup.D134 L.sub.C728
R.sup.D133 R.sup.D78 L.sub.C153 R.sup.D153 R.sup.D153 L.sub.C345 R.sup.D10 R.sup.D48
L.sub.C537 R.sup.D116 R.sup.D135 L.sub.C729 R.sup.D133 R.sup.D79 L.sub.C154 R.sup.D154
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R.sup.D133 R.sup.D88 L.sub.C157 R.sup.D157 R.sup.D157 L.sub.C349 R.sup.D10 R.sup.D55
L.sub.C541 R.sup.D116 R.sup.D145 L.sub.C733 R.sup.D133 R.sup.D89 L.sub.C158 R.sup.D158
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L.sub.C545 R.sup.D116 R.sup.D151 L.sub.C737 R.sup.D133 R.sup.D119 L.sub.C162 R.sup.D162
R.sup.D162 L.sub.C354 R.sup.D10 R.sup.D81 L.sub.C546 R.sup.D116 R.sup.D154 L.sub.C738
R.sup.D133 R.sup.D120 L.sub.C163 R.sup.D163 R.sup.D163 L.sub.C355 R.sup.D10 R.sup.D87
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L.sub.C551 R.sup.D143 R.sup.D5 L.sub.C743 R.sup.D133 R.sup.D146 L.sub.C168 R.sup.D168
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L.sub.C557 R.sup.D143 R.sup.D40 L.sub.C749 R.sup.D133 R.sup.D161 L.sub.C174 R.sup.D174
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R.sup.D175 R.sup.D58 L.sub.C189 R.sup.D189 R.sup.D189 L.sub.C381 R.sup.D17 R.sup.D18
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R.sup.D190 L.sub.C382 R.sup.D17 R.sup.D20 L.sub.C574 R.sup.D143 R.sup.D117 L.sub.C766
R.sup.D175 R.sup.D78 L.sub.C191 R.sup.D191 R.sup.D191 L.sub.C383 R.sup.D17 R.sup.D22
L.sub.C575 R.sup.D143 R.sup.D118 L.sub.C767 R.sup.D175 R.sup.D79 L.sub.C192 R.sup.D192
R.sup.D192 L.sub.C384 R.sup.D17 R.sup.D37 L.sub.C576 R.sup.D143 R.sup.D119 L.sub.C768
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L.sub.C985 R.sup.D4 R.sup.D193 L.sub.C1093 R.sup.D9 R.sup.D193 L.sub.C770 R.sup.D194
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L.sub.C989 R.sup.D4 R.sup.D197 L.sub.C1097 R.sup.D9 R.sup.D197 L.sub.C774 R.sup.D198
R.sup.D198 L.sub.C882 R.sup.D1 R.sup.D198 L.sub.C990 R.sup.D4 R.sup.D198 L.sub.C1098
R.sup.D9 R.sup.D198 L.sub.C775 R.sup.D199 R.sup.D199 L.sub.C883 R.sup.D1 R.sup.D199
L.sub.C991 R.sup.D4 R.sup.D199 L.sub.C1099 R.sup.D9 R.sup.D199 L.sub.C776 R.sup.D200

R.sup.D200 L.sub.C884 R.sup.D1 R.sup.D200 L.sub.C992 R.sup.D4 R.sup.D200 L.sub.C1100 R.sup.D9 R.sup.D200 L.sub.C777 R.sup.D201 R.sup.D201 L.sub.C885 R.sup.D1 R.sup.D201 L.sub.C993 R.sup.D4 R.sup.D201 L.sub.C1101 R.sup.D9 R.sup.D201 L.sub.C778 R.sup.D202 R.sup.D202 L.sub.C886 R.sup.D1 R.sup.D202 L.sub.C994 R.sup.D4 R.sup.D202 L.sub.C1102 R.sup.D9 R.sup.D202 L.sub.C779 R.sup.D203 R.sup.D203 L.sub.C887 R.sup.D1 R.sup.D203 L.sub.C995 R.sup.D4 R.sup.D203 L.sub.C1103 R.sup.D9 R.sup.D203 L.sub.C780 R.sup.D204 R.sup.D204 L.sub.C888 R.sup.D1 R.sup.D204 L.sub.C996 R.sup.D4 R.sup.D204 L.sub.C1104 R.sup.D9 R.sup.D204 L.sub.C781 R.sup.D205 R.sup.D205 L.sub.C889 R.sup.D1 R.sup.D205 L.sub.C997 R.sup.D4 R.sup.D205 L.sub.C1105 R.sup.D9 R.sup.D205 L.sub.C782 R.sup.D206 R.sup.D206 L.sub.C890 R.sup.D1 R.sup.D206 L.sub.C998 R.sup.D4 R.sup.D206 L.sub.C1106 R.sup.D9 R.sup.D206 L.sub.C783 R.sup.D207 R.sup.D207 L.sub.C891 R.sup.D1 R.sup.D207 L.sub.C999 R.sup.D4 R.sup.D207 L.sub.C1107 R.sup.D9 R.sup.D207 L.sub.C784 R.sup.D208 R.sup.D208 L.sub.C892 R.sup.D1 R.sup.D208 L.sub.C1000 R.sup.D4 R.sup.D208 L.sub.C1108 R.sup.D9 R.sup.D208 L.sub.C785 R.sup.D209 R.sup.D209 L.sub.C893 R.sup.D1 R.sup.D209 L.sub.C1001 R.sup.D4 R.sup.D209 L.sub.C1109 R.sup.D9 R.sup.D209 L.sub.C786 R.sup.D210 R.sup.D210 L.sub.C894 R.sup.D1 R.sup.D210 L.sub.C1002 R.sup.D4 R.sup.D210 L.sub.C1110 R.sup.D9 R.sup.D210 L.sub.C787 R.sup.D211 R.sup.D211 L.sub.C895 R.sup.D1 R.sup.D211 L.sub.C1003 R.sup.D4 R.sup.D211 L.sub.C1111 R.sup.D9 R.sup.D211 L.sub.C788 R.sup.D212 R.sup.D212 L.sub.C896 R.sup.D1 R.sup.D212 L.sub.C1004 R.sup.D4 R.sup.D212 L.sub.C1112 R.sup.D9 R.sup.D212 L.sub.C789 R.sup.D213 R.sup.D213 L.sub.C897 R.sup.D1 R.sup.D213 L.sub.C1005 R.sup.D4 R.sup.D213 L.sub.C1113 R.sup.D9 R.sup.D213 L.sub.C790 R.sup.D214 R.sup.D214 L.sub.C898 R.sup.D1 R.sup.D214 L.sub.C1006 R.sup.D4 R.sup.D214 L.sub.C1114 R.sup.D9 R.sup.D214 L.sub.C791 R.sup.D215 R.sup.D215 L.sub.C899 R.sup.D1 R.sup.D215 L.sub.C1007 R.sup.D4 R.sup.D215 L.sub.C1115 R.sup.D9 R.sup.D215 L.sub.C792 R.sup.D216 R.sup.D216 L.sub.C900 R.sup.D1 R.sup.D216 L.sub.C1008 R.sup.D4 R.sup.D216 L.sub.C1116 R.sup.D9 R.sup.D216 L.sub.C793 R.sup.D217 R.sup.D217 L.sub.C901 R.sup.D1 R.sup.D217 L.sub.C1009 R.sup.D4 R.sup.D217 L.sub.C1117 R.sup.D9 R.sup.D217 L.sub.C794 R.sup.D218 R.sup.D218 L.sub.C902 R.sup.D1 R.sup.D218 L.sub.C1010 R.sup.D4 R.sup.D218 L.sub.C1118 R.sup.D9 R.sup.D218 L.sub.C795 R.sup.D219 R.sup.D219 L.sub.C903 R.sup.D1 R.sup.D219 L.sub.C1011 R.sup.D4 R.sup.D219 L.sub.C1119 R.sup.D9 R.sup.D219 L.sub.C796 R.sup.D220 R.sup.D220 L.sub.C904 R.sup.D1 R.sup.D220 L.sub.C1012 R.sup.D4 R.sup.D220 L.sub.C1120 R.sup.D9 R.sup.D220 L.sub.C797 R.sup.D221 R.sup.D221 L.sub.C905 R.sup.D1 R.sup.D221 L.sub.C1013 R.sup.D4 R.sup.D221 L.sub.C1121 R.sup.D9 R.sup.D221 L.sub.C798 R.sup.D222 R.sup.D222 L.sub.C906 R.sup.D1 R.sup.D222 L.sub.C1014 R.sup.D4 R.sup.D222 L.sub.C1122 R.sup.D9 R.sup.D222 L.sub.C799 R.sup.D223 R.sup.D223 L.sub.C907 R.sup.D1 R.sup.D223 L.sub.C1015 R.sup.D4 R.sup.D223 L.sub.C1123 R.sup.D9 R.sup.D223 L.sub.C800 R.sup.D224 R.sup.D224 L.sub.C908 R.sup.D1 R.sup.D224 L.sub.C1016 R.sup.D4 R.sup.D224 L.sub.C1124 R.sup.D9 R.sup.D224 L.sub.C801 R.sup.D225 R.sup.D225 L.sub.C909 R.sup.D1 R.sup.D225 L.sub.C1017 R.sup.D4 R.sup.D225 L.sub.C1125 R.sup.D9 R.sup.D225 L.sub.C802 R.sup.D226 R.sup.D226 L.sub.C910 R.sup.D1 R.sup.D226 L.sub.C1018 R.sup.D4 R.sup.D226 L.sub.C1126 R.sup.D9 R.sup.D226 L.sub.C803 R.sup.D227 R.sup.D227 L.sub.C911 R.sup.D1 R.sup.D227 L.sub.C1019 R.sup.D4 R.sup.D227 L.sub.C1127 R.sup.D9 R.sup.D227 L.sub.C804 R.sup.D228 R.sup.D228 L.sub.C912 R.sup.D1 R.sup.D228 L.sub.C1020 R.sup.D4 R.sup.D228 L.sub.C1128 R.sup.D9 R.sup.D228 L.sub.C805 R.sup.D229 R.sup.D229 L.sub.C913 R.sup.D1 R.sup.D229 L.sub.C1021 R.sup.D4 R.sup.D229 L.sub.C1129 R.sup.D9 R.sup.D229 L.sub.C806 R.sup.D230 R.sup.D230 L.sub.C914 R.sup.D1 R.sup.D230 L.sub.C1022 R.sup.D4 R.sup.D230 L.sub.C1130 R.sup.D9 R.sup.D230 L.sub.C807 R.sup.D231 R.sup.D231 L.sub.C915 R.sup.D1 R.sup.D231 L.sub.C1023 R.sup.D4 R.sup.D231 L.sub.C1131 R.sup.D9 R.sup.D231 L.sub.C808 R.sup.D232 R.sup.D232 L.sub.C916 R.sup.D1 R.sup.D232 L.sub.C1024 R.sup.D4 R.sup.D232 L.sub.C1132 R.sup.D9 R.sup.D232 L.sub.C809 R.sup.D233 R.sup.D233 L.sub.C917 R.sup.D1 R.sup.D233

L.sub.C1025 R.sup.D4 R.sup.D233 L.sub.C1133 R.sup.D9 R.sup.D233 L.sub.C810 R.sup.D234
R.sup.D234 L.sub.C918 R.sup.D1 R.sup.D234 L.sub.C1026 R.sup.D4 R.sup.D234 L.sub.C1134
R.sup.D9 R.sup.D234 L.sub.C811 R.sup.D235 R.sup.D235 L.sub.C919 R.sup.D1 R.sup.D235
L.sub.C1027 R.sup.D4 R.sup.D235 L.sub.C1135 R.sup.D9 R.sup.D235 L.sub.C812 R.sup.D236
R.sup.D236 L.sub.C920 R.sup.D1 R.sup.D236 L.sub.C1028 R.sup.D4 R.sup.D236 L.sub.C1136
R.sup.D9 R.sup.D236 L.sub.C813 R.sup.D237 R.sup.D237 L.sub.C921 R.sup.D1 R.sup.D237
L.sub.C1029 R.sup.D4 R.sup.D237 L.sub.C1137 R.sup.D9 R.sup.D237 L.sub.C814 R.sup.D238
R.sup.D238 L.sub.C922 R.sup.D1 R.sup.D238 L.sub.C1030 R.sup.D4 R.sup.D238 L.sub.C1138
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L.sub.C1031 R.sup.D4 R.sup.D239 L.sub.C1139 R.sup.D9 R.sup.D239 L.sub.C816 R.sup.D240
R.sup.D240 L.sub.C924 R.sup.D1 R.sup.D240 L.sub.C1032 R.sup.D4 R.sup.D240 L.sub.C1140
R.sup.D9 R.sup.D240 L.sub.C817 R.sup.D241 R.sup.D241 L.sub.C925 R.sup.D1 R.sup.D241
L.sub.C1033 R.sup.D4 R.sup.D241 L.sub.C1141 R.sup.D9 R.sup.D241 L.sub.C818 R.sup.D242
R.sup.D242 L.sub.C926 R.sup.D1 R.sup.D242 L.sub.C1034 R.sup.D4 R.sup.D242 L.sub.C1142
R.sup.D9 R.sup.D242 L.sub.C819 R.sup.D243 R.sup.D243 L.sub.C927 R.sup.D1 R.sup.D243
L.sub.C1035 R.sup.D4 R.sup.D243 L.sub.C1143 R.sup.D9 R.sup.D243 L.sub.C820 R.sup.D244
R.sup.D244 L.sub.C928 R.sup.D1 R.sup.D244 L.sub.C1036 R.sup.D4 R.sup.D244 L.sub.C1144
R.sup.D9 R.sup.D244 L.sub.C821 R.sup.D245 R.sup.D245 L.sub.C929 R.sup.D1 R.sup.D245
L.sub.C1037 R.sup.D4 R.sup.D245 L.sub.C1145 R.sup.D9 R.sup.D245 L.sub.C822 R.sup.D246
R.sup.D246 L.sub.C930 R.sup.D1 R.sup.D246 L.sub.C1038 R.sup.D4 R.sup.D246 L.sub.C1146
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L.sub.C1039 R.sup.D145 R.sup.D193 L.sub.C1147 R.sup.D168 R.sup.D193 L.sub.C824
R.sup.D17 R.sup.D194 L.sub.C932 R.sup.D50 R.sup.D194 L.sub.C1040 R.sup.D145 R.sup.D194
L.sub.C1148 R.sup.D168 R.sup.D194 L.sub.C825 R.sup.D17 R.sup.D195 L.sub.C933 R.sup.D50
R.sup.D195 L.sub.C1041 R.sup.D145 R.sup.D195 L.sub.C1149 R.sup.D168 R.sup.D195
L.sub.C826 R.sup.D17 R.sup.D196 L.sub.C934 R.sup.D50 R.sup.D196 L.sub.C1042 R.sup.D145
R.sup.D196 L.sub.C1150 R.sup.D168 R.sup.D196 L.sub.C827 R.sup.D17 R.sup.D197 L.sub.C935
R.sup.D50 R.sup.D197 L.sub.C1043 R.sup.D145 R.sup.D197 L.sub.C1151 R.sup.D168
R.sup.D197 L.sub.C828 R.sup.D17 R.sup.D198 L.sub.C936 R.sup.D50 R.sup.D198 L.sub.C1044
R.sup.D145 R.sup.D198 L.sub.C1152 R.sup.D168 R.sup.D198 L.sub.C829 R.sup.D17 R.sup.D199
L.sub.C937 R.sup.D50 R.sup.D199 L.sub.C1045 R.sup.D145 R.sup.D199 L.sub.C1153
R.sup.D168 R.sup.D199 L.sub.C830 R.sup.D17 R.sup.D200 L.sub.C938 R.sup.D50 R.sup.D200
L.sub.C1046 R.sup.D145 R.sup.D200 L.sub.C1154 R.sup.D168 R.sup.D200 L.sub.C831
R.sup.D17 R.sup.D201 L.sub.C939 R.sup.D50 R.sup.D201 L.sub.C1047 R.sup.D145 R.sup.D201
L.sub.C1155 R.sup.D168 R.sup.D201 L.sub.C832 R.sup.D17 R.sup.D202 L.sub.C940 R.sup.D50
R.sup.D202 L.sub.C1048 R.sup.D145 R.sup.D202 L.sub.C1156 R.sup.D168 R.sup.D202
L.sub.C833 R.sup.D17 R.sup.D203 L.sub.C941 R.sup.D50 R.sup.D203 L.sub.C1049 R.sup.D145
R.sup.D203 L.sub.C1157 R.sup.D168 R.sup.D203 L.sub.C834 R.sup.D17 R.sup.D204 L.sub.C942
R.sup.D50 R.sup.D204 L.sub.C1050 R.sup.D145 R.sup.D204 L.sub.C1158 R.sup.D168
R.sup.D204 L.sub.C835 R.sup.D17 R.sup.D205 L.sub.C943 R.sup.D50 R.sup.D205 L.sub.C1051
R.sup.D145 R.sup.D205 L.sub.C1159 R.sup.D168 R.sup.D205 L.sub.C836 R.sup.D17 R.sup.D206
L.sub.C944 R.sup.D50 R.sup.D206 L.sub.C1052 R.sup.D145 R.sup.D206 L.sub.C1160
R.sup.D168 R.sup.D206 L.sub.C837 R.sup.D17 R.sup.D207 L.sub.C945 R.sup.D50 R.sup.D207
L.sub.C1053 R.sup.D145 R.sup.D207 L.sub.C1161 R.sup.D168 R.sup.D207 L.sub.C838
R.sup.D17 R.sup.D208 L.sub.C946 R.sup.D50 R.sup.D208 L.sub.C1054 R.sup.D145 R.sup.D208
L.sub.C1162 R.sup.D168 R.sup.D208 L.sub.C839 R.sup.D17 R.sup.D209 L.sub.C947 R.sup.D50
R.sup.D209 L.sub.C1055 R.sup.D145 R.sup.D209 L.sub.C1163 R.sup.D168 R.sup.D209
L.sub.C840 R.sup.D17 R.sup.D210 L.sub.C948 R.sup.D50 R.sup.D210 L.sub.C1056 R.sup.D145
R.sup.D210 L.sub.C1164 R.sup.D168 R.sup.D210 L.sub.C841 R.sup.D17 R.sup.D211 L.sub.C949
R.sup.D50 R.sup.D211 L.sub.C1057 R.sup.D145 R.sup.D211 L.sub.C1165 R.sup.D168

R.sup.D211 L.sub.C842 R.sup.D17 R.sup.D212 L.sub.C950 R.sup.D50 R.sup.D212 L.sub.C1058 R.sup.D145 R.sup.D212 L.sub.C1166 R.sup.D168 R.sup.D212 L.sub.C843 R.sup.D17 R.sup.D213 L.sub.C951 R.sup.D50 R.sup.D213 L.sub.C1059 R.sup.D145 R.sup.D213 L.sub.C1167 R.sup.D168 R.sup.D213 L.sub.C844 R.sup.D17 R.sup.D214 L.sub.C952 R.sup.D50 R.sup.D214 L.sub.C1060 R.sup.D145 R.sup.D214 L.sub.C1168 R.sup.D168 R.sup.D214 L.sub.C845 R.sup.D17 R.sup.D215 L.sub.C953 R.sup.D50 R.sup.D215 L.sub.C1061 R.sup.D145 R.sup.D215 L.sub.C1169 R.sup.D168 R.sup.D215 L.sub.C846 R.sup.D17 R.sup.D216 L.sub.C954 R.sup.D50 R.sup.D216 L.sub.C1062 R.sup.D145 R.sup.D216 L.sub.C1170 R.sup.D168 R.sup.D216 L.sub.C847 R.sup.D17 R.sup.D217 L.sub.C955 R.sup.D50 R.sup.D217 L.sub.C1063 R.sup.D145 R.sup.D217 L.sub.C1171 R.sup.D168 R.sup.D217 L.sub.C848 R.sup.D17 R.sup.D218 L.sub.C956 R.sup.D50 R.sup.D218 L.sub.C1064 R.sup.D145 R.sup.D218 L.sub.C1172 R.sup.D168 R.sup.D218 L.sub.C849 R.sup.D17 R.sup.D219 L.sub.C957 R.sup.D50 R.sup.D219 L.sub.C1065 R.sup.D145 R.sup.D219 L.sub.C1173 R.sup.D168 R.sup.D219 L.sub.C850 R.sup.D17 R.sup.D220 L.sub.C958 R.sup.D50 R.sup.D220 L.sub.C1066 R.sup.D145 R.sup.D220 L.sub.C1174 R.sup.D168 R.sup.D220 L.sub.C851 R.sup.D17 R.sup.D221 L.sub.C959 R.sup.D50 R.sup.D221 L.sub.C1067 R.sup.D145 R.sup.D221 L.sub.C1175 R.sup.D168 R.sup.D221 L.sub.C852 R.sup.D17 R.sup.D222 L.sub.C960 R.sup.D50 R.sup.D222 L.sub.C1068 R.sup.D145 R.sup.D222 L.sub.C1176 R.sup.D168 R.sup.D222 L.sub.C853 R.sup.D17 R.sup.D223 L.sub.C961 R.sup.D50 R.sup.D223 L.sub.C1069 R.sup.D145 R.sup.D223 L.sub.C1177 R.sup.D168 R.sup.D223 L.sub.C854 R.sup.D17 R.sup.D224 L.sub.C962 R.sup.D50 R.sup.D224 L.sub.C1070 R.sup.D145 R.sup.D224 L.sub.C1178 R.sup.D168 R.sup.D224 L.sub.C855 R.sup.D17 R.sup.D225 L.sub.C963 R.sup.D50 R.sup.D225 L.sub.C1071 R.sup.D145 R.sup.D225 L.sub.C1179 R.sup.D168 R.sup.D225 L.sub.C856 R.sup.D17 R.sup.D226 L.sub.C964 R.sup.D50 R.sup.D226 L.sub.C1072 R.sup.D145 R.sup.D226 L.sub.C1180 R.sup.D168 R.sup.D226 L.sub.C857 R.sup.D17 R.sup.D227 L.sub.C965 R.sup.D50 R.sup.D227 L.sub.C1073 R.sup.D145 R.sup.D227 L.sub.C1181 R.sup.D168 R.sup.D227 L.sub.C858 R.sup.D17 R.sup.D228 L.sub.C966 R.sup.D50 R.sup.D228 L.sub.C1074 R.sup.D145 R.sup.D228 L.sub.C1182 R.sup.D168 R.sup.D228 L.sub.C859 R.sup.D17 R.sup.D229 L.sub.C967 R.sup.D50 R.sup.D229 L.sub.C1075 R.sup.D145 R.sup.D229 L.sub.C1183 R.sup.D168 R.sup.D229 L.sub.C860 R.sup.D17 R.sup.D230 L.sub.C968 R.sup.D50 R.sup.D230 L.sub.C1076 R.sup.D145 R.sup.D230 L.sub.C1184 R.sup.D168 R.sup.D230 L.sub.C861 R.sup.D17 R.sup.D231 L.sub.C969 R.sup.D50 R.sup.D231 L.sub.C1077 R.sup.D145 R.sup.D231 L.sub.C1185 R.sup.D168 R.sup.D231 L.sub.C862 R.sup.D17 R.sup.D232 L.sub.C970 R.sup.D50 R.sup.D232 L.sub.C1078 R.sup.D145 R.sup.D232 L.sub.C1186 R.sup.D168 R.sup.D232 L.sub.C863 R.sup.D17 R.sup.D233 L.sub.C971 R.sup.D50 R.sup.D233 L.sub.C1079 R.sup.D145 R.sup.D233 L.sub.C1187 R.sup.D168 R.sup.D233 L.sub.C864 R.sup.D17 R.sup.D234 L.sub.C972 R.sup.D50 R.sup.D234 L.sub.C1080 R.sup.D145 R.sup.D234 L.sub.C1188 R.sup.D168 R.sup.D234 L.sub.C865 R.sup.D17 R.sup.D235 L.sub.C973 R.sup.D50 R.sup.D235 L.sub.C1081 R.sup.D145 R.sup.D235 L.sub.C1189 R.sup.D168 R.sup.D235 L.sub.C866 R.sup.D17 R.sup.D236 L.sub.C974 R.sup.D50 R.sup.D236 L.sub.C1082 R.sup.D145 R.sup.D236 L.sub.C1190 R.sup.D168 R.sup.D236 L.sub.C867 R.sup.D17 R.sup.D237 L.sub.C975 R.sup.D50 R.sup.D237 L.sub.C1083 R.sup.D145 R.sup.D237 L.sub.C1191 R.sup.D168 R.sup.D237 L.sub.C868 R.sup.D17 R.sup.D238 L.sub.C976 R.sup.D50 R.sup.D238 L.sub.C1084 R.sup.D145 R.sup.D238 L.sub.C1192 R.sup.D168 R.sup.D238 L.sub.C869 R.sup.D17 R.sup.D239 L.sub.C977 R.sup.D50 R.sup.D239 L.sub.C1085 R.sup.D145 R.sup.D239 L.sub.C1193 R.sup.D168 R.sup.D239 L.sub.C870 R.sup.D17 R.sup.D240 L.sub.C978 R.sup.D50 R.sup.D240 L.sub.C1086 R.sup.D145 R.sup.D240 L.sub.C1194 R.sup.D168 R.sup.D240 L.sub.C871 R.sup.D17 R.sup.D241 L.sub.C979 R.sup.D50 R.sup.D241 L.sub.C1087 R.sup.D145 R.sup.D241 L.sub.C1195 R.sup.D168 R.sup.D241 L.sub.C872 R.sup.D17 R.sup.D242 L.sub.C980 R.sup.D50 R.sup.D242 L.sub.C1088 R.sup.D145 R.sup.D242 L.sub.C1196 R.sup.D168 R.sup.D242 L.sub.C873 R.sup.D17 R.sup.D243 L.sub.C981 R.sup.D50 R.sup.D243 L.sub.C1089 R.sup.D145 R.sup.D243

L.sub.C1197 R.sup.D168 R.sup.D243 L.sub.C874 R.sup.D17 R.sup.D244 L.sub.C982 R.sup.D50 R.sup.D244 L.sub.C1090 R.sup.D145 R.sup.D244 L.sub.C1198 R.sup.D168 R.sup.D244 L.sub.C875 R.sup.D17 R.sup.D245 L.sub.C983 R.sup.D50 R.sup.D245 L.sub.C1091 R.sup.D145 R.sup.D245 L.sub.C1199 R.sup.D168 R.sup.D245 L.sub.C876 R.sup.D17 R.sup.D246 L.sub.C984 R.sup.D50 R.sup.D246 L.sub.C1092 R.sup.D145 R.sup.D246 L.sub.C1200 R.sup.D168 R.sup.D246 L.sub.C1201 R.sup.D10 R.sup.D193 L.sub.C1255 R.sup.D55 R.sup.D193 L.sub.C1309 R.sup.D37 R.sup.D193 L.sub.C1363 R.sup.D143 R.sup.D193 L.sub.C1202 R.sup.D10 R.sup.D194 L.sub.C1256 R.sup.D55 R.sup.D194 L.sub.C1310 R.sup.D37 R.sup.D194 L.sub.C1364 R.sup.D143 R.sup.D194 L.sub.C1203 R.sup.D10 R.sup.D195 L.sub.C1257 R.sup.D55 R.sup.D195 L.sub.C1311 R.sup.D37 R.sup.D195 L.sub.C1365 R.sup.D143 R.sup.D195 L.sub.C1204 R.sup.D10 R.sup.D196 L.sub.C1258 R.sup.D55 R.sup.D196 L.sub.C1312 R.sup.D37 R.sup.D196 L.sub.C1366 R.sup.D143 R.sup.D196 L.sub.C1205 R.sup.D10 R.sup.D197 L.sub.C1259 R.sup.D55 R.sup.D197 L.sub.C1313 R.sup.D37 R.sup.D197 L.sub.C1367 R.sup.D143 R.sup.D197 L.sub.C1206 R.sup.D10 R.sup.D198 L.sub.C1260 R.sup.D55 R.sup.D198 L.sub.C1314 R.sup.D37 R.sup.D198 L.sub.C1368 R.sup.D143 R.sup.D198 L.sub.C1207 R.sup.D10 R.sup.D199 L.sub.C1261 R.sup.D55 R.sup.D199 L.sub.C1315 R.sup.D37 R.sup.D199 L.sub.C1369 R.sup.D143 R.sup.D199 L.sub.C1208 R.sup.D10 R.sup.D200 L.sub.C1262 R.sup.D55 R.sup.D200 L.sub.C1316 R.sup.D37 R.sup.D200 L.sub.C1370 R.sup.D143 R.sup.D200 L.sub.C1209 R.sup.D10 R.sup.D201 L.sub.C1263 R.sup.D55 R.sup.D201 L.sub.C1317 R.sup.D37 R.sup.D201 L.sub.C1371 R.sup.D143 R.sup.D201 L.sub.C1210 R.sup.D10 R.sup.D202 L.sub.C1264 R.sup.D55 R.sup.D202 L.sub.C1318 R.sup.D37 R.sup.D202 L.sub.C1372 R.sup.D143 R.sup.D202 L.sub.C1211 R.sup.D10 R.sup.D203 L.sub.C1265 R.sup.D55 R.sup.D203 L.sub.C1319 R.sup.D37 R.sup.D203 L.sub.C1373 R.sup.D143 R.sup.D203 L.sub.C1212 R.sup.D10 R.sup.D204 L.sub.C1266 R.sup.D55 R.sup.D204 L.sub.C1320 R.sup.D37 R.sup.D204 L.sub.C1374 R.sup.D143 R.sup.D204 L.sub.C1213 R.sup.D10 R.sup.D205 L.sub.C1267 R.sup.D55 R.sup.D205 L.sub.C1321 R.sup.D37 R.sup.D205 L.sub.C1375 R.sup.D143 R.sup.D205 L.sub.C1214 R.sup.D10 R.sup.D206 L.sub.C1268 R.sup.D55 R.sup.D206 L.sub.C1322 R.sup.D37 R.sup.D206 L.sub.C1376 R.sup.D143 R.sup.D206 L.sub.C1215 R.sup.D10 R.sup.D207 L.sub.C1269 R.sup.D55 R.sup.D207 L.sub.C1323 R.sup.D37 R.sup.D207 L.sub.C1377 R.sup.D143 R.sup.D207 L.sub.C1216 R.sup.D10 R.sup.D208 L.sub.C1270 R.sup.D55 R.sup.D208 L.sub.C1324 R.sup.D37 R.sup.D208 L.sub.C1378 R.sup.D143 R.sup.D208 L.sub.C1217 R.sup.D10 R.sup.D209 L.sub.C1271 R.sup.D55 R.sup.D209 L.sub.C1325 R.sup.D37 R.sup.D209 L.sub.C1379 R.sup.D143 R.sup.D209 L.sub.C1218 R.sup.D10 R.sup.D210 L.sub.C1272 R.sup.D55 R.sup.D210 L.sub.C1326 R.sup.D37 R.sup.D210 L.sub.C1380 R.sup.D143 R.sup.D210 L.sub.C1219 R.sup.D10 R.sup.D211 L.sub.C1273 R.sup.D55 R.sup.D211 L.sub.C1327 R.sup.D37 R.sup.D211 L.sub.C1381 R.sup.D143 R.sup.D211 L.sub.C1220 R.sup.D10 R.sup.D212 L.sub.C1274 R.sup.D55 R.sup.D212 L.sub.C1328 R.sup.D37 R.sup.D212 L.sub.C1382 R.sup.D143 R.sup.D212 L.sub.C1221 R.sup.D10 R.sup.D213 L.sub.C1275 R.sup.D55 R.sup.D213 L.sub.C1329 R.sup.D37 R.sup.D213 L.sub.C1383 R.sup.D143 R.sup.D213 L.sub.C1222 R.sup.D10 R.sup.D214 L.sub.C1276 R.sup.D55 R.sup.D214 L.sub.C1330 R.sup.D37 R.sup.D214 L.sub.C1384 R.sup.D143 R.sup.D214 L.sub.C1223 R.sup.D10 R.sup.D215 L.sub.C1277 R.sup.D55 R.sup.D215 L.sub.C1331 R.sup.D37 R.sup.D215 L.sub.C1385 R.sup.D143 R.sup.D215 L.sub.C1224 R.sup.D10 R.sup.D216 L.sub.C1278 R.sup.D55 R.sup.D216 L.sub.C1332 R.sup.D37 R.sup.D216 L.sub.C1386 R.sup.D143 R.sup.D216 L.sub.C1225 R.sup.D10 R.sup.D217 L.sub.C1279 R.sup.D55 R.sup.D217 L.sub.C1333 R.sup.D37 R.sup.D217 L.sub.C1387 R.sup.D143 R.sup.D217 L.sub.C1226 R.sup.D10 R.sup.D218 L.sub.C1280 R.sup.D55 R.sup.D218 L.sub.C1334 R.sup.D37 R.sup.D218 L.sub.C1388 R.sup.D143 R.sup.D218 L.sub.C1227 R.sup.D10 R.sup.D219 L.sub.C1281 R.sup.D55 R.sup.D219 L.sub.C1335 R.sup.D37 R.sup.D219 L.sub.C1389 R.sup.D143 R.sup.D219 L.sub.C1228 R.sup.D10 R.sup.D220 L.sub.C1282 R.sup.D55 R.sup.D220 L.sub.C1336 R.sup.D37 R.sup.D220 L.sub.C1390 R.sup.D143 R.sup.D220

L.sub.C1229 R.sup.D10 R.sup.D221 L.sub.C1283 R.sup.D55 R.sup.D221 L.sub.C1337 R.sup.D37 R.sup.D221 L.sub.C1391 R.sup.D143 R.sup.D221 L.sub.C1230 R.sup.D10 R.sup.D222 L.sub.C1284 R.sup.D55 R.sup.D222 L.sub.C1338 R.sup.D37 R.sup.D222 L.sub.C1392 R.sup.D143 R.sup.D222 L.sub.C1231 R.sup.D10 R.sup.D223 L.sub.C1285 R.sup.D55 R.sup.D223 L.sub.C1339 R.sup.D37 R.sup.D223 L.sub.C1393 R.sup.D143 R.sup.D223 L.sub.C1232 R.sup.D10 R.sup.D224 L.sub.C1286 R.sup.D55 R.sup.D224 L.sub.C1340 R.sup.D37 R.sup.D224 L.sub.C1394 R.sup.D143 R.sup.D224 L.sub.C1233 R.sup.D10 R.sup.D225 L.sub.C1287 R.sup.D55 R.sup.D225 L.sub.C1341 R.sup.D37 R.sup.D225 L.sub.C1395 R.sup.D143 R.sup.D225 L.sub.C1234 R.sup.D10 R.sup.D226 L.sub.C1288 R.sup.D55 R.sup.D226 L.sub.C1342 R.sup.D37 R.sup.D226 L.sub.C1396 R.sup.D143 R.sup.D226 L.sub.C1235 R.sup.D10 R.sup.D227 L.sub.C1289 R.sup.D55 R.sup.D227 L.sub.C1343 R.sup.D37 R.sup.D227 L.sub.C1397 R.sup.D143 R.sup.D227 L.sub.C1236 R.sup.D10 R.sup.D228 L.sub.C1290 R.sup.D55 R.sup.D228 L.sub.C1344 R.sup.D37 R.sup.D228 L.sub.C1398 R.sup.D143 R.sup.D228 L.sub.C1237 R.sup.D10 R.sup.D229 L.sub.C1291 R.sup.D55 R.sup.D229 L.sub.C1345 R.sup.D37 R.sup.D229 L.sub.C1399 R.sup.D143 R.sup.D229 L.sub.C1238 R.sup.D10 R.sup.D230 L.sub.C1292 R.sup.D55 R.sup.D230 L.sub.C1346 R.sup.D37 R.sup.D230 L.sub.C1400 R.sup.D143 R.sup.D230 L.sub.C1239 R.sup.D10 R.sup.D231 L.sub.C1293 R.sup.D55 R.sup.D231 L.sub.C1347 R.sup.D37 R.sup.D231 L.sub.C1401 R.sup.D143 R.sup.D231 L.sub.C1240 R.sup.D10 R.sup.D232 L.sub.C1294 R.sup.D55 R.sup.D232 L.sub.C1348 R.sup.D37 R.sup.D232 L.sub.C1402 R.sup.D143 R.sup.D232 L.sub.C1241 R.sup.D10 R.sup.D233 L.sub.C1295 R.sup.D55 R.sup.D233 L.sub.C1349 R.sup.D37 R.sup.D233 L.sub.C1403 R.sup.D143 R.sup.D233 L.sub.C1242 R.sup.D10 R.sup.D234 L.sub.C1296 R.sup.D55 R.sup.D234 L.sub.C1350 R.sup.D37 R.sup.D234 L.sub.C1404 R.sup.D143 R.sup.D234 L.sub.C1243 R.sup.D10 R.sup.D235 L.sub.C1297 R.sup.D55 R.sup.D235 L.sub.C1351 R.sup.D37 R.sup.D235 L.sub.C1405 R.sup.D143 R.sup.D235 L.sub.C1244 R.sup.D10 R.sup.D236 L.sub.C1298 R.sup.D55 R.sup.D236 L.sub.C1352 R.sup.D37 R.sup.D236 L.sub.C1406 R.sup.D143 R.sup.D236 L.sub.C1245 R.sup.D10 R.sup.D237 L.sub.C1299 R.sup.D55 R.sup.D237 L.sub.C1353 R.sup.D37 R.sup.D237 L.sub.C1407 R.sup.D143 R.sup.D237 L.sub.C1246 R.sup.D10 R.sup.D238 L.sub.C1300 R.sup.D55 R.sup.D238 L.sub.C1354 R.sup.D37 R.sup.D238 L.sub.C1408 R.sup.D143 R.sup.D238 L.sub.C1247 R.sup.D10 R.sup.D239 L.sub.C1301 R.sup.D55 R.sup.D239 L.sub.C1355 R.sup.D37 R.sup.D239 L.sub.C1409 R.sup.D143 R.sup.D239 L.sub.C1248 R.sup.D10 R.sup.D240 L.sub.C1302 R.sup.D55 R.sup.D240 L.sub.C1356 R.sup.D37 R.sup.D240 L.sub.C1410 R.sup.D143 R.sup.D240 L.sub.C1249 R.sup.D10 R.sup.D241 L.sub.C1303 R.sup.D55 R.sup.D241 L.sub.C1357 R.sup.D37 R.sup.D241 L.sub.C1411 R.sup.D143 R.sup.D241 L.sub.C1250 R.sup.D10 R.sup.D242 L.sub.C1304 R.sup.D55 R.sup.D242 L.sub.C1358 R.sup.D37 R.sup.D242 L.sub.C1412 R.sup.D143 R.sup.D242 L.sub.C1251 R.sup.D10 R.sup.D243 L.sub.C1305 R.sup.D55 R.sup.D243 L.sub.C1359 R.sup.D37 R.sup.D243 L.sub.C1413 R.sup.D143 R.sup.D243 L.sub.C1252 R.sup.D10 R.sup.D244 L.sub.C1306 R.sup.D55 R.sup.D244 L.sub.C1360 R.sup.D37 R.sup.D244 L.sub.C1414 R.sup.D143 R.sup.D244 L.sub.C1253 R.sup.D10 R.sup.D245 L.sub.C1307 R.sup.D55 R.sup.D245 L.sub.C1361 R.sup.D37 R.sup.D245 L.sub.C1415 R.sup.D143 R.sup.D245 L.sub.C1254 R.sup.D10 R.sup.D246 L.sub.C1308 R.sup.D55 R.sup.D246 L.sub.C1362 R.sup.D37 R.sup.D246 L.sub.C1416 R.sup.D143 R.sup.D246

wherein R.sup.D1 to R.sup.D246 have the structures defined in the following LIST 10:

##STR00418## ##STR00419## ##STR00420## ##STR00421## ##STR00422## ##STR00423## ##STR00424## ##STR00425## ##STR00426## ##STR00427## ##STR00428## ##STR00429## ##STR00430## ##STR00431## ##STR00432## ##STR00433## ##STR00434## ##STR00435## ##STR00436## ##STR00437##

Claims

1. A compound having a first ligand L.sub.A comprising a structure of Formula I: ##STR00438## wherein: at least one of the following statements is true: (1) R.sup.C comprises at least one silyl or germyl group; (2) R.sup.C is Formula II: ##STR00439## each of moiety B and moiety D is independently a monocyclic ring or a polycyclic fused ring system, wherein the monocyclic ring or each ring of the polycyclic fused ring system is independently a 5-membered to 10-membered carbocyclic or heterocyclic ring; each of X.sup.1 to X.sup.5 is independently C or N; Y.sup.1 and Y.sup.2 are each independently selected from the group consisting of BR, BRR′, NR, PR, P(O)R, O, S, Se, C═O, C═S, C═Se, C═NR′, C═CRR′, S═O, SO.sub.2, CR, CRR′, SiRR′, and GeRR′; K is selected from the group consisting of a direct bond, O, S, N(R.sup.α), P(R.sup.α), B(R.sup.α), C(R.sup.α) (R.sup.B), and Si(R.sup.c) (R.sup.B); each of R.sup.A, R.sup.B, and R.sup.D each independently represents mono to the maximum allowable substitution, or no substitution; each R, R′, R.sup.α, RP, R.sup.A, R.sup.B, and R.sup.D is independently hydrogen or a substituent selected from the group consisting of deuterium, halogen, alkyl, cycloalkyl, heteroalkyl, heterocycloalkyl, boryl, arylalkyl, alkoxy, aryloxy, amino, silyl, germyl, alkenyl, cycloalkenyl, heteroalkenyl, alkynyl, aryl, heteroaryl, acyl, carboxylic acid, ether, ester, nitrile, isonitrile, sulfanyl, sulfinyl, sulfonyl, phosphino, selenyl, and combinations thereof; R.sup.C is a substituent selected from the group consisting of alkyl, cycloalkyl, heteroalkyl, heterocycloalkyl, boryl, arylalkyl, alkoxy, aryloxy, amino, silyl, germyl, alkenyl, cycloalkenyl, heteroalkenyl, alkynyl, aryl, heteroaryl, acyl, carboxylic acid, ether, ester, nitrile, isonitrile, sulfanyl, sulfinyl, sulfonyl, phosphino, selenyl, partially or fully deuterated variants thereof, partially or fully halogenated variants thereof, and combinations thereof; L.sub.A is coordinated to a metal M through the indicated dashed lines; M has an atomic mass of at least 40; M can be coordinated to other ligands; L.sub.A can be joined with other ligands to comprise a tridentate, tetradentate, pentadentate, or hexadentate ligand; any two substituents may be joined or fused to form a ring; with the proviso that Y.sup.2 and R.sup.B are not joined to form a ring; and with the proviso that if moiety D is phenyl, then at least one R.sup.D comprises one chemical group selected from the group consisting of: deuterium, halogen, alkyl having five or more carbon atoms, cycloalkyl, heteroalkyl, heterocycloalkyl, arylalkyl, alkoxy, aryloxy, amino, silyl, germyl, boryl, alkenyl, cycloalkenyl, heteroalkenyl, alkynyl, aryl, heteroaryl, acyl, carboxylic acid, ether, ester, nitrile, isonitrile, sulfanyl, sulfinyl, sulfonyl, phosphino, boryl, selenyl, and combinations thereof.

2. The compound of claim 1, wherein each of R, R′, R.sup.α, RP, R.sup.A, R.sup.B, and R.sup.D is independently hydrogen or a substituent selected from the group consisting of deuterium, fluorine, alkyl, cycloalkyl, heteroalkyl, alkoxy, aryloxy, amino, silyl, germyl, boryl, alkenyl, cycloalkenyl, heteroalkenyl, aryl, heteroaryl, nitrile, isonitrile, sulfanyl, and combinations thereof; and R.sup.C is a substituent selected from the group consisting of alkyl, cycloalkyl, heteroalkyl, alkoxy, aryloxy, amino, silyl, germyl, boryl, alkenyl, cycloalkenyl, heteroalkenyl, aryl, heteroaryl, nitrile, isonitrile, sulfanyl, partially or fully deuterated variants thereof, partially or fully fluorinated variants thereof, and combinations thereof.

3. The compound of claim 1, wherein moiety B is selected from the group consisting of the following Cyclic Moiety List: benzene, pyridine, pyrimidine, pyridazine, pyrazine, triazine, imidazole, pyrazole, pyrrole, oxazole, furan, thiophene, thiazole, triazole, naphthalene, quinoline, isoquinoline, quinazoline, quinoxaline, benzofuran, aza-benzofuran, phenanthro[3,2-b]benzofuran, benzoxazole, aza-benzoxazole, benzothiophene, aza-benzothiophene, benzothiazole, aza-benzothiazole, benzoselenophene, aza-benzoselenophene, indene, aza-indene, indole, aza-indole, benzimidazole, aza-benzimidazole, benzobenzimidazole, aza-benzobenzimidazole, carbazole, aza-carbazole, dibenzofuran, aza-dibenzofuran, dibenzothiophene, aza-dibenzothiophene, phthalazine, phenanthrene, aza-phenanthrene, anthracene, aza-anthracene, phenanthridine, fluorene, and aza-fluorene; and/or wherein two R.sup.A are joined or fused to form a Moiety Al; and/or wherein two R.sup.B are joined or fused to form a ring; and/or wherein two R.sup.D are joined or fused to form

a ring.
4. The compound of claim 1, wherein X.sup.1 and X.sup.2 are both C or wherein one of X.sup.1 and X.sup.2 is C and the other of X.sup.1 and X.sup.2 is N; and/or wherein each of X.sup.3 to X.sup.5 is C or wherein at least one of X.sup.3 to X.sup.5 is N; and/or wherein Y.sup.1 is selected from the group consisting of O, S, NR, CRR′, SiRR′, and Se; and/or wherein Y.sup.2 is selected from the group consisting of O, S, NR, CRR′, SiRR′, C═O, and Se; and/or wherein K is selected from the group consisting of a direct bond, O, and S.
5. The compound of claim 1, wherein at least one R.sup.A comprises a substituent selected from the group consisting of alkyl, cycloalkyl, aryl, heteroaryl, and combinations thereof; and/or wherein at least one R.sup.A comprises an electron-withdrawing group selected from the group consisting of the structures in the following EWG1 LIST: F, CF.sub.3, CN, COCH.sub.3, CHO, COCF.sub.3, COOMe, COOCF.sub.3, NO.sub.2, SF.sub.3, SiF.sub.3, PF.sub.4, SF.sub.5, OCF.sub.3, SCF.sub.3, SeCF.sub.3, SOCF.sub.3, SeOCF.sub.3, SO.sub.2F, SO.sub.2CF.sub.3, SeO.sub.2CF.sub.3, OSeO.sub.2CF.sub.3, OCN, SCN, SeCN, NC, .sup.+N(R.sup.k2).sub.3, (R.sup.K2).sub.2CCN, (R.sup.k2).sub.2CCF.sub.3, CNC(CF.sub.3).sub.2, BR.sup.k3R.sup.k2, substituted or unsubstituted dibenzoborole, 1-substituted carbazole, 1,9-substituted carbazole, substituted or unsubstituted carbazole, substituted or unsubstituted pyridine, substituted or unsubstituted pyrimidine, substituted or unsubstituted pyrazine, substituted or unsubstituted pyridoxine, substituted or unsubstituted triazine, substituted or unsubstituted oxazole, substituted or unsubstituted benzoxazole, substituted or unsubstituted thiazole, substituted or unsubstituted benzothiazole, substituted or unsubstituted imidazole, substituted or unsubstituted benzimidazole, ketone, carboxylic acid, ester, nitrile, isonitrile, sulfinyl, sulfonyl, partially and fully fluorinated alkyl, partially and fully fluorinated aryl, partially and fully fluorinated heteroaryl, cyano-containing alkyl, cyano-containing aryl, cyano-containing heteroaryl, isocyanate, ##STR00440## ##STR00441## and/or wherein at least one R.sup.B comprises a substituent selected from the group consisting of alkyl, cycloalkyl, aryl, heteroaryl, and combinations thereof; and/or wherein at least one R.sup.B comprises an electron-withdrawing group selected from the group consisting of the structures of the EWG1 LIST; and/or wherein at least one R.sup.D comprises a substituent selected from the group consisting of alkyl, cycloalkyl, aryl, heteroaryl, and combinations thereof; and/or wherein at least one R.sup.D comprises an electron-withdrawing group selected from the group consisting of the structures of the EWG1 LIST; and/or wherein the metal M is selected from the group consisting of Ir, Rh, R.sub.e, Ru, Os, Pt, Pd, Ag, Au, and Cu; wherein in the structures in the EWG1 LIST, each R.sup.k1 represents mono to the maximum allowable substitution, or no substitutions; Y.sup.G is selected from the group consisting of BR.sub.e, NR.sub.e, PR.sub.e, O, S, Se, C═O, S═O, SO.sub.2, CR.sub.eR.sub.f, SiR.sub.eR.sub.f, and GeR.sub.eR.sub.f; and each of R.sup.k1, R.sup.k2, R.sup.k3, R.sub.e, and R.sub.f is independently a hydrogen, or a substituent selected from the group consisting of deuterium, halogen, alkyl, cycloalkyl, heteroalkyl, heterocycloalkyl, arylalkyl, alkoxy, aryloxy, amino, silyl, germyl, boryl, alkenyl, cycloalkenyl, heteroalkenyl, alkynyl, aryl, heteroaryl, acyl, carboxylic acid, ether, ester, nitrile, isonitrile, sulfanyl, selenyl, sulfinyl, sulfonyl, phosphino, and combinations thereof.
6. The compound of claim 1, wherein R.sup.C comprises at least one silyl or germyl group; and/or wherein R.sup.C is or comprises -L-Q (R.sup.1A) (R.sup.1B) (R.sup.1C), wherein L is an organic linker or a direct bond, Q is Si or Ge, and wherein RIA, R.sup.1B, and R.sup.1C are each independently hydrogen or a substituent selected from the group consisting of deuterium, halogen, alkyl, cycloalkyl, heteroalkyl, heterocycloalkyl, arylalkyl, alkoxy, aryloxy, amino, silyl, germyl, boryl, alkenyl, cycloalkenyl, heteroalkenyl, alkynyl, aryl, heteroaryl, acyl, carboxylic acid, ether, ester, nitrile, isonitrile, sulfanyl, selenyl, sulfinyl, sulfonyl, phosphino, and combinations thereof.
7. The compound of claim 1, wherein R.sup.C has the structure of Formula II: ##STR00442## and/or wherein moiety D is selected from the group consisting of Cyclic Moiety List defined herein; and/or wherein two R.sup.D are joined to form a ring, where the portion formed by the two

R.sup.D is saturated.

8. The compound of claim 1, wherein the ligand L.sub.A is selected from the group consisting of: ##STR00443## ##STR00444## ##STR00445## ##STR00446## ##STR00447## ##STR00448## wherein X for each occurrence is independently C or N; Y.sup.B1 and Y.sup.B2 are each independently selected from the group consisting of a direct bond, BR, BRR′, NR, PR, P(O)R, O, S, Se, C═O, C═S, C═Se, C═NR, C═CRR′, S═O, SO.sub.2, CR, CRR′, SiRR′, and GeRR′; R.sup.BB represents mono to the maximum allowable substitution, or no substitution; each R.sup.BB is independently hydrogen, or a substituent selected from the group consisting of deuterium, halogen, alkyl, cycloalkyl, heteroalkyl, heterocycloalkyl, arylalkyl, alkoxy, aryloxy, amino, silyl, germyl, boryl, alkenyl, cycloalkenyl, heteroalkenyl, alkynyl, aryl, heteroaryl, acyl, carboxylic acid, ether, ester, nitrile, isonitrile, sulfanyl, sulfinyl, sulfonyl, phosphino, selenyl, and combinations thereof; the remaining variables are the same as previously defined; and any two substituents can be joined or fused to form a ring.

9. The compound of claim 1, wherein the ligand L.sub.A is selected from the group consisting of: ##STR00449## ##STR00450## ##STR00451## ##STR00452## ##STR00453## ##STR00454## wherein X for each occurrence is independently C or N; Y.sup.B1 and Y.sup.B2 are each independently selected from the group consisting of a direct bond, BR, BRR′, NR, PR, P(O)R, O, S, Se, C═O, C═S, C═Se, C═NR, C═CRR′, S═O, SO.sub.2, CR, CRR′, SiRR′, and GeRR′; R.sup.BB represents mono to the maximum allowable substitution, or no substitution; each R.sup.BB is independently hydrogen, or a substituent selected from the group consisting of deuterium, halogen, alkyl, cycloalkyl, heteroalkyl, heterocycloalkyl, arylalkyl, alkoxy, aryloxy, amino, silyl, germyl, boryl, alkenyl, cycloalkenyl, heteroalkenyl, alkynyl, aryl, heteroaryl, acyl, carboxylic acid, ether, ester, nitrile, isonitrile, sulfanyl, sulfinyl, sulfonyl, phosphino, selenyl, and combinations thereof; the remaining variables are the same as previously defined; and any two substituents can be joined or fused to form a ring.

10. The compound of claim 1, wherein the ligand L.sub.A is selected from L.sub.A1 (R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE); wherein i is an integer from 1 to 152, each of R.sup.EB, R.sup.EC, R.sup.ED, and R.sup.EE is independently selected from the group consisting of R.sub.1 to R.sub.295; R.sup.EA is selected from the group consisting of R.sub.66 to R.sub.295, wherein each of L.sub.A1 (R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A152 (R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) is defined as follows: TABLE-US-00004 L.sub.A Structure of L.sub.A L.sub.A1(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A1(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A1(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  embedded image L.sub.A2(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A2(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A2(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  embedded image L.sub.A3(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A3(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A3(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  embedded image L.sub.A4(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A4(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A4(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  embedded image L.sub.A5(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A5(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A5(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  embedded image L.sub.A6(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A6(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A6(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  embedded image L.sub.A7(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A7(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A7(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  embedded image L.sub.A8(R.sup.EA)

(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A8(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A8(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A9(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A9(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A9(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A10(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A10(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A10(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A11(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A11(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A11(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A12(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A12(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A12(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A13(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A13(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A13(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A14(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A14(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A14(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  embedded image L.sub.A15(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A15(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A15(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  embedded image L.sub.A16(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A16(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A16(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  embedded image L.sub.A17(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A17(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A17(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A18(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A18(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A18(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A19(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A19(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A19(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A20(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A20(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A20(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A21(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A21(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A21(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A22(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A22(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A22(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A23(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A23(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A23(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A24(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A24(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A24(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A25(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A25(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A25(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A26(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A26(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A26(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure

embedded image L.sub.A27(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A27(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A27(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure
embedded image L.sub.A28(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A28(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A28(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure
embedded image L.sub.A29(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A29(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A29(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure
embedded image L.sub.A30(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A30(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A30(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure
embedded image L.sub.A31(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A31(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A31(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure
embedded image L.sub.A32(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A32(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A32(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure
embedded image L.sub.A33(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A33(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A33(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure
embedded image L.sub.A34(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A34(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A34(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure
embedded image L.sub.A35(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A35(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A35(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure
embedded image L.sub.A36(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A36(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A36(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure
embedded image L.sub.A37(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A37(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A37(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure
embedded image L.sub.A38(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A38(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A38(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure
embedded image L.sub.A39(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A39(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A39(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure
embedded image L.sub.A40(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A40(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A40(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure
embedded image L.sub.A41(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A41(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A41(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure
embedded image L.sub.A42(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A42(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A42(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure
embedded image L.sub.A43(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A43(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A43(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure
embedded image L.sub.A44(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A44(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A44(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure
embedded image L.sub.A45(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A45(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A45(R.sub.295)(R.sub.295)

(R.sub.295)(R.sub.295)(R.sub.295) have the structure  L.sub.A46(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A46(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A46(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  L.sub.A47(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A47(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A47(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  L.sub.A48(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A48(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A48(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  L.sub.A49(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A49(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A49(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  L.sub.A50(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A50(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A50(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  L.sub.A51(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A51(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A51(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  L.sub.A52(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A52(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A52(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  L.sub.A53(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A53(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A53(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  L.sub.A54(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A54(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A54(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  L.sub.A55(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A55(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A55(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  L.sub.A56(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A56(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A56(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure L.sub.A57(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A57(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A57(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  L.sub.A58(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A58(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A58(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  L.sub.A59(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A59(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A59(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  L.sub.A60(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A60(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A60(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  L.sub.A61(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A61(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A61(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  L.sub.A62(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A62(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A62(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  L.sub.A63(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A63(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A63(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  L.sub.A64(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A64(R.sub.66)(R.sub.1)(R.sub.1)

(R.sub.1)(R.sub.1) to L.sub.A64(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  , wherein L.sub.A65(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A65(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A65(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  , wherein L.sub.A66(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A66(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A66(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  , wherein L.sub.A67(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A67(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A67(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  , wherein L.sub.A68(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A68(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A68(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  , wherein L.sub.A69(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A69(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A69(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  , wherein L.sub.A70(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A70(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A70(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  , wherein L.sub.A71(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A71(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A71(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  , wherein L.sub.A72(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A72(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A72(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  , wherein L.sub.A73(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A73(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A73(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  , wherein L.sub.A74(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A74(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A74(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  , wherein L.sub.A75(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A75(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A75(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  , wherein L.sub.A76(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A76(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A76(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  , wherein L.sub.A77(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A77(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A77(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  , wherein L.sub.A78(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A78(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A78(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  , wherein L.sub.A79(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A79(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A79(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  , wherein L.sub.A80(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A80(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A80(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  , wherein L.sub.A81(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A81(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A81(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  , wherein L.sub.A82(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A82(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A82(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  , wherein L.sub.A83(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)

(R.sup.EE), wherein L.sub.A83(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A83(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  embedded image L.sub.A84(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A84(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A84(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A85(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A85(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A85(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A86(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A86(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A86(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A87(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A87(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A87(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A88(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A88(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A88(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A89(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A89(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A89(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A90(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A90(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A90(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A91(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A91(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A91(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A92(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A92(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A92(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A93(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A93(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A93(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A94(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A94(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A94(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A95(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A95(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A95(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A96(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A96(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A96(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A97(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A97(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A97(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A98(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A98(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A98(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A99(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A99(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A99(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A100(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A100(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A100(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A101(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A101(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A101(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure

embedded image L.sub.A102(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A102(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A102(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A103(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A103(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A103(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A104(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A104(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A104(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A105(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A105(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A105(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A106(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A106(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A106(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A107(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A107(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A107(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A108(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A108(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A108(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A109(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A109(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A109(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A110(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A110(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A110(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A111(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A111(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A111(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A112(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A112(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A112(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A113(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A113(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A113(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A114(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A114(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A114(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A115(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A115(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A115(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A116(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A116(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A116(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A117(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A117(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A117(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A118(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A118(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A118(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A119(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A119(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A119(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure embedded image L.sub.A120(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A120(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A120(R.sub.295)(R.sub.295)

(R.sub.295)(R.sub.295)(R.sub.295) have the structure  L.sub.A121(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A121(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A121(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  L.sub.A122(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A122(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A122(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure L.sub.A123(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A123(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A123(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure L.sub.A124(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A124(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A124(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure L.sub.A125(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A125(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A125(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure L.sub.A126(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A126(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A126(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure L.sub.A127(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A127(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A127(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure L.sub.A128(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A128(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A128(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure L.sub.A129(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A129(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A129(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure L.sub.A130(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A130(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A130(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure L.sub.A131(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A131(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A131(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure L.sub.A132(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A132(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A132(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure L.sub.A133(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A133(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A133(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure L.sub.A134(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A134(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A134(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure L.sub.A135(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A135(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A135(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure L.sub.A136(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A136(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A136(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure L.sub.A137(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A137(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A137(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure L.sub.A138(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A138(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A138(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure L.sub.A139(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A139(R.sub.66)(R.sub.1)(R.sub.1)

(R.sub.1)(R.sub.1) to L.sub.A139(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  embedded image L.sub.A140(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A140(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A140(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  embedded image L.sub.A141(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A141(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A141(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  embedded image L.sub.A142(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A142(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A142(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  embedded image L.sub.A143(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A143(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A143(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  embedded image L.sub.A144(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A144(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A144(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  embedded image L.sub.A145(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A145(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A145(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  embedded image L.sub.A146(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A146(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A146(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  embedded image L.sub.A147(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A147(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A147(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  embedded image L.sub.A148(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A148(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A148(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  embedded image L.sub.A149(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A149(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A149(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  embedded image L.sub.A150(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A150(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A150(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  embedded image L.sub.A151(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A151(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A151(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  embedded image L.sub.A152(R.sup.EA)(R.sup.EB)(R.sup.EC)(R.sup.ED)(R.sup.EE), wherein L.sub.A152(R.sub.66)(R.sub.1)(R.sub.1)(R.sub.1)(R.sub.1) to L.sub.A152(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295)(R.sub.295) have the structure  embedded image ##STR00607## ##STR00608## ##STR00609## ##STR00610## ##STR00611## ##STR00612## ##STR00613## ##STR00614## ##STR00615## ##STR00616## ##STR00617## ##STR00618## ##STR00619## ##STR00620## ##STR00621## ##STR00622## ##STR00623## ##STR00624## ##STR00625## ##STR00626## ##STR00627## ##STR00628## ##STR00629## ##STR00630## ##STR00631## ##STR00632## ##STR00633## ##STR00634## ##STR00635## ##STR00636## ##STR00637## ##STR00638## ##STR00639## wherein R.sub.1 to R.sub.295 have the following structures: ##STR00640## ##STR00641## ##STR00642## ##STR00643## ##STR00644## ##STR00645##

11. The compound of claim 1, wherein the compound has a formula of M(L.sub.A).sub.p(L.sub.B).sub.q(L.sub.c), wherein L.sub.B and L.sub.c are each a bidentate ligand; and wherein p is 1, 2, or 3; q is 0, 1, or 2; r is 0, 1, or 2; and p+q+r is the oxidation state of the metal M.

12. The compound of claim 11, wherein the compound has a formula selected from the group consisting of Ir(L.sub.A).sub.3, Ir(L.sub.A) (L.sub.B).sub.2, Ir(L.sub.A).sub.2 (L.sub.B),

Ir(L.sub.A).sub.2 (L.sub.c), and Ir(L.sub.A) (L.sub.B) (L.sub.c); and wherein L.sub.A, L.sub.B, and L.sub.c are different from each other; or a formula of Pt(L.sub.A) (L.sub.B), wherein L.sub.A and L.sub.B can be same or different.

13. The compound of claim 11, wherein L.sub.B and L.sub.c are each independently selected from the group consisting of: ##STR00646## ##STR00647## ##STR00648## ##STR00649## wherein: T is selected from the group consisting of B, Al, Ga, and In; K.sup.1′ is selected from the group consisting of a single bond, O, S, NR.sub.e, PR.sub.e, BR.sub.e, CR.sub.eR.sub.f, and SiR.sub.eR.sub.f, each of Y.sup.1 to Y.sup.13 is independently selected from the group consisting of C and N; Y′ is selected from the group consisting of BR.sub.e, BR.sub.eR.sub.f, NR.sub.e, PR.sub.e, P(O) R.sub.e, O, S, Se, C═O, C═S, C═Se, C═NR.sub.e, C═CR.sub.eR.sub.f, S═O, SO.sub.2, CR.sub.eR.sub.f, SiR.sub.eR.sub.f, and GeR.sub.eR.sub.f; R.sub.e and R.sub.f can be fused or joined to form a ring; each R.sub.a, R.sub.b, R.sub.c, and R.sub.d independently represents from mono to the maximum allowed number of substitutions, or no substitution; each of R.sub.a1, R.sub.b1, R.sub.c1, R.sub.d1, R.sub.a, R.sub.b, R.sub.c, R.sub.d, R.sub.e, and R.sub.f is independently a hydrogen or a substituent selected from the group consisting of deuterium, halide, alkyl, cycloalkyl, heteroalkyl, arylalkyl, alkoxy, aryloxy, amino, silyl, germyl, boryl, alkenyl, cycloalkenyl, heteroalkenyl, alkynyl, aryl, heteroaryl, acyl, carbonyl, carboxylic acid, ester, nitrile, isonitrile, sulfanyl, selenyl, sulfinyl, sulfonyl, phosphino, and combinations thereof; and any two substituents of R.sub.a1, R.sub.b1, R.sub.c1, R.sub.d1, R.sub.a, R.sub.b, R.sub.c, R.sub.d, R.sub.e, and R.sub.f can be fused or joined to form a ring or form a multidentate ligand.

14. The compound of claim 11, wherein the compound has formula Ir(L.sub.A).sub.3, formula Ir(L.sub.A) (L.sub.Bk).sub.2, formula Ir(L.sub.A).sub.2 (L.sub.Bk), formula Ir(L.sub.A).sub.2 (L.sub.cj-I), or Ir(L.sub.A).sub.2 (L.sub.Cj-II), wherein L.sub.A is according to Formula I; wherein k is an integer from 1 to 541, and each L.sub.Bk has the structure defined as follows: ##STR00650## ##STR00651## ##STR00652## ##STR00653## ##STR00654## ##STR00655## ##STR00656## ##STR00657## ##STR00658## ##STR00659## ##STR00660## ##STR00661## ##STR00662## ##STR00663## ##STR00664## ##STR00665## ##STR00666## ##STR00667## ##STR00668## ##STR00669## ##STR00670## ##STR00671## ##STR00672## ##STR00673## ##STR00674## ##STR00675## ##STR00676## ##STR00677## ##STR00678## ##STR00679## ##STR00680## ##STR00681## ##STR00682## ##STR00683## ##STR00684## ##STR00685## ##STR00686## ##STR00687## ##STR00688## ##STR00689## ##STR00690## ##STR00691## ##STR00692## ##STR00693## ##STR00694## ##STR00695## ##STR00696## ##STR00697## ##STR00698## ##STR00699## ##STR00700## ##STR00701## ##STR00702## ##STR00703## ##STR00704## ##STR00705## ##STR00706## ##STR00707## ##STR00708## ##STR00709## ##STR00710## ##STR00711## ##STR00712## ##STR00713## ##STR00714## ##STR00715## ##STR00716## ##STR00717## ##STR00718## ##STR00719## ##STR00720## ##STR00721## ##STR00722## ##STR00723## ##STR00724## ##STR00725## ##STR00726## ##STR00727## ##STR00728## ##STR00729## ##STR00730## ##STR00731## ##STR00732## ##STR00733## ##STR00734## ##STR00735## ##STR00736## ##STR00737## ##STR00738## ##STR00739## ##STR00740## ##STR00741## ##STR00742## ##STR00743## ##STR00744## ##STR00745## ##STR00746## ##STR00747## ##STR00748## ##STR00749## ##STR00750## ##STR00751## ##STR00752## ##STR00753## ##STR00754## ##STR00755## ##STR00756## ##STR00757## ##STR00758## ##STR00759## ##STR00760## ##STR00761## ##STR00762## ##STR00763## ##STR00764## ##STR00765## ##STR00766## wherein each L.sub.cj-I has a structure based on formula ##STR00767## and each L.sub.cj-n has a structure based on formula ##STR00768## wherein for each L.sub.cj in L.sub.cj-I and L.sub.cj-II, R.sup.201 and R.sup.202 have the structures defined as follows: TABLE-US-00005 L.sub.Cj R.sup.201 R.sup.202 L.sub.Cj R.sup.201 R.sup.202 L.sub.Cj R.sup.201 R.sup.202 L.sub.Cj R.sup.201 R.sup.202 L.sub.C1 R.sup.D1 R.sup.D1 L.sub.C193 R.sup.D1 R.sup.D3 L.sub.C385 R.sup.D17 R.sup.D40 L.sub.C577 R.sup.D143 R.sup.D120 L.sub.C2 R.sup.D2 R.sup.D2 L.sub.C194 R.sup.D1 R.sup.D4 L.sub.C386

R.sup.D17 R.sup.D41 L.sub.C578 R.sup.D143 R.sup.D133 L.sub.C3 R.sup.D3 R.sup.D3
L.sub.C195 R.sup.D1 R.sup.D5 L.sub.C387 R.sup.D17 R.sup.D42 L.sub.C579 R.sup.D143
R.sup.D134 L.sub.C4 R.sup.D4 R.sup.D4 L.sub.C196 R.sup.D1 R.sup.D9 L.sub.C388 R.sup.D17
R.sup.D43 L.sub.C580 R.sup.D143 R.sup.D135 L.sub.C5 R.sup.D5 R.sup.D5 L.sub.C197
R.sup.D1 R.sup.D10 L.sub.C389 R.sup.D17 R.sup.D48 L.sub.C581 R.sup.D143 R.sup.D136
L.sub.C6 R.sup.D6 R.sup.D6 L.sub.C198 R.sup.D1 R.sup.D17 L.sub.C390 R.sup.D17 R.sup.D49
L.sub.C582 R.sup.D143 R.sup.D144 L.sub.C7 R.sup.D7 R.sup.D7 L.sub.C199 R.sup.D1
R.sup.D18 L.sub.C391 R.sup.D17 R.sup.D50 L.sub.C583 R.sup.D143 R.sup.D145 L.sub.C8
R.sup.D8 R.sup.D8 L.sub.C200 R.sup.D1 R.sup.D20 L.sub.C392 R.sup.D17 R.sup.D54
L.sub.C584 R.sup.D143 R.sup.D146 L.sub.C9 R.sup.D9 R.sup.D9 L.sub.C201 R.sup.D1
R.sup.D22 L.sub.C393 R.sup.D17 R.sup.D55 L.sub.C585 R.sup.D143 R.sup.D147 L.sub.C10
R.sup.D10 R.sup.D10 L.sub.C202 R.sup.D1 R.sup.D37 L.sub.C394 R.sup.D17 R.sup.D58
L.sub.C586 R.sup.D143 R.sup.D149 L.sub.C11 R.sup.D11 R.sup.D11 L.sub.C203 R.sup.D1
R.sup.D40 L.sub.C395 R.sup.D17 R.sup.D59 L.sub.C587 R.sup.D143 R.sup.D151 L.sub.C12
R.sup.D12 R.sup.D12 L.sub.C204 R.sup.D1 R.sup.D41 L.sub.C396 R.sup.D17 R.sup.D78
L.sub.C588 R.sup.D143 R.sup.D154 L.sub.C13 R.sup.D13 R.sup.D13 L.sub.C205 R.sup.D1
R.sup.D42 L.sub.C397 R.sup.D17 R.sup.D79 L.sub.C589 R.sup.D143 R.sup.D155 L.sub.C14
R.sup.D14 R.sup.D14 L.sub.C206 R.sup.D1 R.sup.D43 L.sub.C398 R.sup.D17 R.sup.D81
L.sub.C590 R.sup.D143 R.sup.D161 L.sub.C15 R.sup.D15 R.sup.D15 L.sub.C207 R.sup.D1
R.sup.D48 L.sub.C399 R.sup.D17 R.sup.D87 L.sub.C591 R.sup.D143 R.sup.D175 L.sub.C16
R.sup.D16 R.sup.D16 L.sub.C208 R.sup.D1 R.sup.D49 L.sub.C400 R.sup.D17 R.sup.D88
L.sub.C592 R.sup.D144 R.sup.D3 L.sub.C17 R.sup.D17 R.sup.D17 L.sub.C209 R.sup.D1
R.sup.D50 L.sub.C401 R.sup.D17 R.sup.D89 L.sub.C593 R.sup.D144 R.sup.D5 L.sub.C18
R.sup.D18 R.sup.D18 L.sub.C210 R.sup.D1 R.sup.D54 L.sub.C402 R.sup.D17 R.sup.D93
L.sub.C594 R.sup.D144 R.sup.D17 L.sub.C19 R.sup.D19 R.sup.D19 L.sub.C211 R.sup.D1
R.sup.D55 L.sub.C403 R.sup.D17 R.sup.D116 L.sub.C595 R.sup.D144 R.sup.D18 L.sub.C20
R.sup.D20 R.sup.D20 L.sub.C212 R.sup.D1 R.sup.D58 L.sub.C404 R.sup.D17 R.sup.D117
L.sub.C596 R.sup.D144 R.sup.D20 L.sub.C21 R.sup.D21 R.sup.D21 L.sub.C213 R.sup.D1
R.sup.D59 L.sub.C405 R.sup.D17 R.sup.D118 L.sub.C597 R.sup.D144 R.sup.D22 L.sub.C22
R.sup.D22 R.sup.D22 L.sub.C214 R.sup.D1 R.sup.D78 L.sub.C406 R.sup.D17 R.sup.D119
L.sub.C598 R.sup.D144 R.sup.D37 L.sub.C23 R.sup.D23 R.sup.D23 L.sub.C215 R.sup.D1
R.sup.D79 L.sub.C407 R.sup.D17 R.sup.D120 L.sub.C599 R.sup.D144 R.sup.D40 L.sub.C24
R.sup.D24 R.sup.D24 L.sub.C216 R.sup.D1 R.sup.D81 L.sub.C408 R.sup.D17 R.sup.D133
L.sub.C600 R.sup.D144 R.sup.D41 L.sub.C25 R.sup.D25 R.sup.D25 L.sub.C217 R.sup.D1
R.sup.D87 L.sub.C409 R.sup.D17 R.sup.D134 L.sub.C601 R.sup.D144 R.sup.D42 L.sub.C26
R.sup.D26 R.sup.D26 L.sub.C218 R.sup.D1 R.sup.D88 L.sub.C410 R.sup.D17 R.sup.D135
L.sub.C602 R.sup.D144 R.sup.D43 L.sub.C27 R.sup.D27 R.sup.D27 L.sub.C219 R.sup.D1
R.sup.D89 L.sub.C411 R.sup.D17 R.sup.D136 L.sub.C603 R.sup.D144 R.sup.D48 L.sub.C28
R.sup.D28 R.sup.D28 L.sub.C220 R.sup.D1 R.sup.D93 L.sub.C412 R.sup.D17 R.sup.D143
L.sub.C604 R.sup.D144 R.sup.D49 L.sub.C29 R.sup.D29 R.sup.D29 L.sub.C221 R.sup.D1
R.sup.D116 L.sub.C413 R.sup.D17 R.sup.D144 L.sub.C605 R.sup.D144 R.sup.D54 L.sub.C30
R.sup.D30 R.sup.D30 L.sub.C222 R.sup.D1 R.sup.D117 L.sub.C414 R.sup.D17 R.sup.D145
L.sub.C606 R.sup.D144 R.sup.D58 L.sub.C31 R.sup.D31 R.sup.D31 L.sub.C223 R.sup.D1
R.sup.D118 L.sub.C415 R.sup.D17 R.sup.D146 L.sub.C607 R.sup.D144 R.sup.D59 L.sub.C32
R.sup.D32 R.sup.D32 L.sub.C224 R.sup.D1 R.sup.D119 L.sub.C416 R.sup.D17 R.sup.D147
L.sub.C608 R.sup.D144 R.sup.D78 L.sub.C33 R.sup.D33 R.sup.D33 L.sub.C225 R.sup.D1
R.sup.D120 L.sub.C417 R.sup.D17 R.sup.D149 L.sub.C609 R.sup.D144 R.sup.D79 L.sub.C34
R.sup.D34 R.sup.D34 L.sub.C226 R.sup.D1 R.sup.D133 L.sub.C418 R.sup.D17 R.sup.D151
L.sub.C610 R.sup.D144 R.sup.D81 L.sub.C35 R.sup.D35 R.sup.D35 L.sub.C227 R.sup.D1
R.sup.D134 L.sub.C419 R.sup.D17 R.sup.D154 L.sub.C611 R.sup.D144 R.sup.D87 L.sub.C36

R.sup.D36 R.sup.D36 L.sub.C228 R.sup.D1 R.sup.D135 L.sub.C420 R.sup.D17 R.sup.D155
L.sub.C612 R.sup.D144 R.sup.D88 L.sub.C37 R.sup.D37 R.sup.D37 L.sub.C229 R.sup.D1
R.sup.D136 L.sub.C421 R.sup.D17 R.sup.D161 L.sub.C613 R.sup.D144 R.sup.D89 L.sub.C38
R.sup.D38 R.sup.D38 L.sub.C230 R.sup.D1 R.sup.D143 L.sub.C422 R.sup.D17 R.sup.D175
L.sub.C614 R.sup.D144 R.sup.D93 L.sub.C39 R.sup.D39 R.sup.D39 L.sub.C231 R.sup.D1
R.sup.D144 L.sub.C423 R.sup.D50 R.sup.D3 L.sub.C615 R.sup.D144 R.sup.D116 L.sub.C40
R.sup.D40 R.sup.D40 L.sub.C232 R.sup.D1 R.sup.D145 L.sub.C424 R.sup.D50 R.sup.D5
L.sub.C616 R.sup.D144 R.sup.D117 L.sub.C41 R.sup.D41 R.sup.D41 L.sub.C233 R.sup.D1
R.sup.D146 L.sub.C425 R.sup.D50 R.sup.D18 L.sub.C617 R.sup.D144 R.sup.D118 L.sub.C42
R.sup.D42 R.sup.D42 L.sub.C234 R.sup.D1 R.sup.D147 L.sub.C426 R.sup.D50 R.sup.D20
L.sub.C618 R.sup.D144 R.sup.D119 L.sub.C43 R.sup.D43 R.sup.D43 L.sub.C235 R.sup.D1
R.sup.D149 L.sub.C427 R.sup.D50 R.sup.D22 L.sub.C619 R.sup.D144 R.sup.D120 L.sub.C44
R.sup.D44 R.sup.D44 L.sub.C236 R.sup.D1 R.sup.D151 L.sub.C428 R.sup.D50 R.sup.D37
L.sub.C620 R.sup.D144 R.sup.D133 L.sub.C45 R.sup.D45 R.sup.D45 L.sub.C237 R.sup.D1
R.sup.D154 L.sub.C429 R.sup.D50 R.sup.D40 L.sub.C621 R.sup.D144 R.sup.D134 L.sub.C46
R.sup.D46 R.sup.D46 L.sub.C238 R.sup.D1 R.sup.D155 L.sub.C430 R.sup.D50 R.sup.D41
L.sub.C622 R.sup.D144 R.sup.D135 L.sub.C47 R.sup.D47 R.sup.D47 L.sub.C239 R.sup.D1
R.sup.D161 L.sub.C431 R.sup.D50 R.sup.D42 L.sub.C623 R.sup.D144 R.sup.D136 L.sub.C48
R.sup.D48 R.sup.D48 L.sub.C240 R.sup.D1 R.sup.D175 L.sub.C432 R.sup.D50 R.sup.D43
L.sub.C624 R.sup.D144 R.sup.D145 L.sub.C49 R.sup.D49 R.sup.D49 L.sub.C241 R.sup.D4
R.sup.D3 L.sub.C433 R.sup.D50 R.sup.D48 L.sub.C625 R.sup.D144 R.sup.D146 L.sub.C50
R.sup.D50 R.sup.D50 L.sub.C242 R.sup.D4 R.sup.D5 L.sub.C434 R.sup.D50 R.sup.D49
L.sub.C626 R.sup.D144 R.sup.D147 L.sub.C51 R.sup.D51 R.sup.D51 L.sub.C243 R.sup.D4
R.sup.D9 L.sub.C435 R.sup.D50 R.sup.D54 L.sub.C627 R.sup.D144 R.sup.D149 L.sub.C52
R.sup.D52 R.sup.D52 L.sub.C244 R.sup.D4 R.sup.D10 L.sub.C436 R.sup.D50 R.sup.D55
L.sub.C628 R.sup.D144 R.sup.D151 L.sub.C53 R.sup.D53 R.sup.D53 L.sub.C245 R.sup.D4
R.sup.D17 L.sub.C437 R.sup.D50 R.sup.D58 L.sub.C629 R.sup.D144 R.sup.D154 L.sub.C54
R.sup.D54 R.sup.D54 L.sub.C246 R.sup.D4 R.sup.D18 L.sub.C438 R.sup.D50 R.sup.D59
L.sub.C630 R.sup.D144 R.sup.D155 L.sub.C55 R.sup.D55 R.sup.D55 L.sub.C247 R.sup.D4
R.sup.D20 L.sub.C439 R.sup.D50 R.sup.D78 L.sub.C631 R.sup.D144 R.sup.D161 L.sub.C56
R.sup.D56 R.sup.D56 L.sub.C248 R.sup.D4 R.sup.D22 L.sub.C440 R.sup.D50 R.sup.D79
L.sub.C632 R.sup.D144 R.sup.D175 L.sub.C57 R.sup.D57 R.sup.D57 L.sub.C249 R.sup.D4
R.sup.D37 L.sub.C441 R.sup.D50 R.sup.D81 L.sub.C633 R.sup.D145 R.sup.D3 L.sub.C58
R.sup.D58 R.sup.D58 L.sub.C250 R.sup.D4 R.sup.D40 L.sub.C442 R.sup.D50 R.sup.D87
L.sub.C634 R.sup.D145 R.sup.D5 L.sub.C59 R.sup.D59 R.sup.D59 L.sub.C251 R.sup.D4
R.sup.D41 L.sub.C443 R.sup.D50 R.sup.D88 L.sub.C635 R.sup.D145 R.sup.D17 L.sub.C60
R.sup.D60 R.sup.D60 L.sub.C252 R.sup.D4 R.sup.D42 L.sub.C444 R.sup.D50 R.sup.D89
L.sub.C636 R.sup.D145 R.sup.D18 L.sub.C61 R.sup.D61 R.sup.D61 L.sub.C253 R.sup.D4
R.sup.D43 L.sub.C445 R.sup.D50 R.sup.D93 L.sub.C637 R.sup.D145 R.sup.D20 L.sub.C62
R.sup.D62 R.sup.D62 L.sub.C254 R.sup.D4 R.sup.D48 L.sub.C446 R.sup.D50 R.sup.D116
L.sub.C638 R.sup.D145 R.sup.D22 L.sub.C63 R.sup.D63 R.sup.D63 L.sub.C255 R.sup.D4
R.sup.D49 L.sub.C447 R.sup.D50 R.sup.D117 L.sub.C639 R.sup.D145 R.sup.D37 L.sub.C64
R.sup.D64 R.sup.D64 L.sub.C256 R.sup.D4 R.sup.D50 L.sub.C448 R.sup.D50 R.sup.D118
L.sub.C640 R.sup.D145 R.sup.D40 L.sub.C65 R.sup.D65 R.sup.D65 L.sub.C257 R.sup.D4
R.sup.D54 L.sub.C449 R.sup.D50 R.sup.D119 L.sub.C641 R.sup.D145 R.sup.D41 L.sub.C66
R.sup.D66 R.sup.D66 L.sub.C258 R.sup.D4 R.sup.D55 L.sub.C450 R.sup.D50 R.sup.D120
L.sub.C642 R.sup.D145 R.sup.D42 L.sub.C67 R.sup.D67 R.sup.D67 L.sub.C259 R.sup.D4
R.sup.D58 L.sub.C451 R.sup.D50 R.sup.D133 L.sub.C643 R.sup.D145 R.sup.D43 L.sub.C68
R.sup.D68 R.sup.D68 L.sub.C260 R.sup.D4 R.sup.D59 L.sub.C452 R.sup.D50 R.sup.D134
L.sub.C644 R.sup.D145 R.sup.D48 L.sub.C69 R.sup.D69 R.sup.D69 L.sub.C261 R.sup.D4

R.sup.D78 L.sub.C453 R.sup.D50 R.sup.D135 L.sub.C645 R.sup.D145 R.sup.D49 L.sub.C70
R.sup.D70 R.sup.D70 L.sub.C262 R.sup.D4 R.sup.D79 L.sub.C454 R.sup.D50 R.sup.D136
L.sub.C646 R.sup.D145 R.sup.D54 L.sub.C71 R.sup.D71 R.sup.D71 L.sub.C263 R.sup.D4
R.sup.D81 L.sub.C455 R.sup.D50 R.sup.D143 L.sub.C647 R.sup.D145 R.sup.D58 L.sub.C72
R.sup.D72 R.sup.D72 L.sub.C264 R.sup.D4 R.sup.D87 L.sub.C456 R.sup.D50 R.sup.D144
L.sub.C648 R.sup.D145 R.sup.D59 L.sub.C73 R.sup.D73 R.sup.D73 L.sub.C265 R.sup.D4
R.sup.D88 L.sub.C457 R.sup.D50 R.sup.D145 L.sub.C649 R.sup.D145 R.sup.D78 L.sub.C74
R.sup.D74 R.sup.D74 L.sub.C266 R.sup.D4 R.sup.D89 L.sub.C458 R.sup.D50 R.sup.D146
L.sub.C650 R.sup.D145 R.sup.D79 L.sub.C75 R.sup.D75 R.sup.D75 L.sub.C267 R.sup.D4
R.sup.D93 L.sub.C459 R.sup.D50 R.sup.D147 L.sub.C651 R.sup.D145 R.sup.D81 L.sub.C76
R.sup.D76 R.sup.D76 L.sub.C268 R.sup.D4 R.sup.D116 L.sub.C460 R.sup.D50 R.sup.D149
L.sub.C652 R.sup.D145 R.sup.D87 L.sub.C77 R.sup.D77 R.sup.D77 L.sub.C269 R.sup.D4
R.sup.D117 L.sub.C461 R.sup.D50 R.sup.D151 L.sub.C653 R.sup.D145 R.sup.D88 L.sub.C78
R.sup.D78 R.sup.D78 L.sub.C270 R.sup.D4 R.sup.D118 L.sub.C462 R.sup.D50 R.sup.D154
L.sub.C654 R.sup.D145 R.sup.D89 L.sub.C79 R.sup.D79 R.sup.D79 L.sub.C271 R.sup.D4
R.sup.D119 L.sub.C463 R.sup.D50 R.sup.D155 L.sub.C655 R.sup.D145 R.sup.D93 L.sub.C80
R.sup.D80 R.sup.D80 L.sub.C272 R.sup.D4 R.sup.D120 L.sub.C464 R.sup.D50 R.sup.D161
L.sub.C656 R.sup.D145 R.sup.D116 L.sub.C81 R.sup.D81 R.sup.D81 L.sub.C273 R.sup.D4
R.sup.D133 L.sub.C465 R.sup.D50 R.sup.D175 L.sub.C657 R.sup.D145 R.sup.D117 L.sub.C82
R.sup.D82 R.sup.D82 L.sub.C274 R.sup.D4 R.sup.D134 L.sub.C466 R.sup.D55 R.sup.D3
L.sub.C658 R.sup.D145 R.sup.D118 L.sub.C83 R.sup.D83 R.sup.D83 L.sub.C275 R.sup.D4
R.sup.D135 L.sub.C467 R.sup.D55 R.sup.D5 L.sub.C659 R.sup.D145 R.sup.D119 L.sub.C84
R.sup.D84 R.sup.D84 L.sub.C276 R.sup.D4 R.sup.D136 L.sub.C468 R.sup.D55 R.sup.D18
L.sub.C660 R.sup.D145 R.sup.D120 L.sub.C85 R.sup.D85 R.sup.D85 L.sub.C277 R.sup.D4
R.sup.D143 L.sub.C469 R.sup.D55 R.sup.D20 L.sub.C661 R.sup.D145 R.sup.D133 L.sub.C86
R.sup.D86 R.sup.D86 L.sub.C278 R.sup.D4 R.sup.D144 L.sub.C470 R.sup.D55 R.sup.D22
L.sub.C662 R.sup.D145 R.sup.D134 L.sub.C87 R.sup.D87 R.sup.D87 L.sub.C279 R.sup.D4
R.sup.D145 L.sub.C471 R.sup.D55 R.sup.D37 L.sub.C663 R.sup.D145 R.sup.D135 L.sub.C88
R.sup.D88 R.sup.D88 L.sub.C280 R.sup.D4 R.sup.D146 L.sub.C472 R.sup.D55 R.sup.D40
L.sub.C664 R.sup.D145 R.sup.D136 L.sub.C89 R.sup.D89 R.sup.D89 L.sub.C281 R.sup.D4
R.sup.D147 L.sub.C473 R.sup.D55 R.sup.D41 L.sub.C665 R.sup.D145 R.sup.D146 L.sub.C90
R.sup.D90 R.sup.D90 L.sub.C282 R.sup.D4 R.sup.D149 L.sub.C474 R.sup.D55 R.sup.D42
L.sub.C666 R.sup.D145 R.sup.D147 L.sub.C91 R.sup.D91 R.sup.D91 L.sub.C283 R.sup.D4
R.sup.D151 L.sub.C475 R.sup.D55 R.sup.D43 L.sub.C667 R.sup.D145 R.sup.D149 L.sub.C92
R.sup.D92 R.sup.D92 L.sub.C284 R.sup.D4 R.sup.D154 L.sub.C476 R.sup.D55 R.sup.D48
L.sub.C668 R.sup.D145 R.sup.D151 L.sub.C93 R.sup.D93 R.sup.D93 L.sub.C285 R.sup.D4
R.sup.D155 L.sub.C477 R.sup.D55 R.sup.D49 L.sub.C669 R.sup.D145 R.sup.D154 L.sub.C94
R.sup.D94 R.sup.D94 L.sub.C286 R.sup.D4 R.sup.D161 L.sub.C478 R.sup.D55 R.sup.D54
L.sub.C670 R.sup.D145 R.sup.D155 L.sub.C95 R.sup.D95 R.sup.D95 L.sub.C287 R.sup.D4
R.sup.D175 L.sub.C479 R.sup.D55 R.sup.D58 L.sub.C671 R.sup.D145 R.sup.D161 L.sub.C96
R.sup.D96 R.sup.D96 L.sub.C288 R.sup.D9 R.sup.D3 L.sub.C480 R.sup.D55 R.sup.D59
L.sub.C672 R.sup.D145 R.sup.D175 L.sub.C97 R.sup.D97 R.sup.D97 L.sub.C289 R.sup.D9
R.sup.D5 L.sub.C481 R.sup.D55 R.sup.D78 L.sub.C673 R.sup.D146 R.sup.D3 L.sub.C98
R.sup.D98 R.sup.D98 L.sub.C290 R.sup.D9 R.sup.D10 L.sub.C482 R.sup.D55 R.sup.D79
L.sub.C674 R.sup.D146 R.sup.D5 L.sub.C99 R.sup.D99 R.sup.D99 L.sub.C291 R.sup.D9
R.sup.D17 L.sub.C483 R.sup.D55 R.sup.D81 L.sub.C675 R.sup.D146 R.sup.D17 L.sub.C100
R.sup.D100 R.sup.D100 L.sub.C292 R.sup.D9 R.sup.D18 L.sub.C484 R.sup.D55 R.sup.D87
L.sub.C676 R.sup.D146 R.sup.D18 L.sub.C101 R.sup.D101 R.sup.D101 L.sub.C293 R.sup.D9
R.sup.D20 L.sub.C485 R.sup.D55 R.sup.D88 L.sub.C677 R.sup.D146 R.sup.D20 L.sub.C102
R.sup.D102 R.sup.D102 L.sub.C294 R.sup.D9 R.sup.D22 L.sub.C486 R.sup.D55 R.sup.D89

L.sub.C678 R.sup.D146 R.sup.D22 L.sub.C103 R.sup.D103 R.sup.D103 L.sub.C295 R.sup.D9
R.sup.D37 L.sub.C487 R.sup.D55 R.sup.D93 L.sub.C679 R.sup.D146 R.sup.D37 L.sub.C104
R.sup.D104 R.sup.D104 L.sub.C296 R.sup.D9 R.sup.D40 L.sub.C488 R.sup.D55 R.sup.D116
L.sub.C680 R.sup.D146 R.sup.D40 L.sub.C105 R.sup.D105 R.sup.D105 L.sub.C297 R.sup.D9
R.sup.D41 L.sub.C489 R.sup.D55 R.sup.D117 L.sub.C681 R.sup.D146 R.sup.D41 L.sub.C106
R.sup.D106 R.sup.D106 L.sub.C298 R.sup.D9 R.sup.D42 L.sub.C490 R.sup.D55 R.sup.D118
L.sub.C682 R.sup.D146 R.sup.D42 L.sub.C107 R.sup.D107 R.sup.D107 L.sub.C299 R.sup.D9
R.sup.D43 L.sub.C491 R.sup.D55 R.sup.D119 L.sub.C683 R.sup.D146 R.sup.D43 L.sub.C108
R.sup.D108 R.sup.D108 L.sub.C300 R.sup.D9 R.sup.D48 L.sub.C492 R.sup.D55 R.sup.D120
L.sub.C684 R.sup.D146 R.sup.D48 L.sub.C109 R.sup.D109 R.sup.D109 L.sub.C301 R.sup.D9
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R.sup.D110 R.sup.D110 L.sub.C302 R.sup.D9 R.sup.D50 L.sub.C494 R.sup.D55 R.sup.D134
L.sub.C686 R.sup.D146 R.sup.D54 L.sub.C111 R.sup.D111 R.sup.D111 L.sub.C303 R.sup.D9
R.sup.D54 L.sub.C495 R.sup.D55 R.sup.D135 L.sub.C687 R.sup.D146 R.sup.D58 L.sub.C112
R.sup.D112 R.sup.D112 L.sub.C304 R.sup.D9 R.sup.D55 L.sub.C496 R.sup.D55 R.sup.D136
L.sub.C688 R.sup.D146 R.sup.D59 L.sub.C113 R.sup.D113 R.sup.D113 L.sub.C305 R.sup.D9
R.sup.D58 L.sub.C497 R.sup.D55 R.sup.D143 L.sub.C689 R.sup.D146 R.sup.D78 L.sub.C114
R.sup.D114 R.sup.D114 L.sub.C306 R.sup.D9 R.sup.D59 L.sub.C498 R.sup.D55 R.sup.D144
L.sub.C690 R.sup.D146 R.sup.D79 L.sub.C115 R.sup.D115 R.sup.D115 L.sub.C307 R.sup.D9
R.sup.D78 L.sub.C499 R.sup.D55 R.sup.D145 L.sub.C691 R.sup.D146 R.sup.D81 L.sub.C116
R.sup.D116 R.sup.D116 L.sub.C308 R.sup.D9 R.sup.D79 L.sub.C500 R.sup.D55 R.sup.D146
L.sub.C692 R.sup.D146 R.sup.D87 L.sub.C117 R.sup.D117 R.sup.D117 L.sub.C309 R.sup.D9
R.sup.D81 L.sub.C501 R.sup.D55 R.sup.D147 L.sub.C693 R.sup.D146 R.sup.D88 L.sub.C118
R.sup.D118 R.sup.D118 L.sub.C310 R.sup.D9 R.sup.D87 L.sub.C502 R.sup.D55 R.sup.D149
L.sub.C694 R.sup.D146 R.sup.D89 L.sub.C119 R.sup.D119 R.sup.D119 L.sub.C311 R.sup.D9
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L.sub.C696 R.sup.D146 R.sup.D117 L.sub.C121 R.sup.D121 R.sup.D121 L.sub.C313 R.sup.D9
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L.sub.C698 R.sup.D146 R.sup.D119 L.sub.C123 R.sup.D123 R.sup.D123 L.sub.C315 R.sup.D9
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R.sup.D124 R.sup.D124 L.sub.C316 R.sup.D9 R.sup.D118 L.sub.C508 R.sup.D116 R.sup.D3
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R.sup.D119 L.sub.C509 R.sup.D116 R.sup.D5 L.sub.C701 R.sup.D146 R.sup.D134 L.sub.C126
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L.sub.C704 R.sup.D146 R.sup.D146 L.sub.C129 R.sup.D129 R.sup.D129 L.sub.C321 R.sup.D9
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L.sub.C708 R.sup.D146 R.sup.D154 L.sub.C133 R.sup.D133 R.sup.D133 L.sub.C325 R.sup.D9
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R.sup.D136 R.sup.D136 L.sub.C328 R.sup.D9 R.sup.D149 L.sub.C520 R.sup.D116 R.sup.D49
L.sub.C712 R.sup.D133 R.sup.D3 L.sub.C137 R.sup.D137 R.sup.D137 L.sub.C329 R.sup.D9
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L.sub.C714 R.sup.D133 R.sup.D3 L.sub.C139 R.sup.D139 R.sup.D139 L.sub.C331 R.sup.D9
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L.sub.C724 R.sup.D133 R.sup.D49 L.sub.C149 R.sup.D149 R.sup.D149 L.sub.C341 R.sup.D10
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R.sup.D162 R.sup.D162 L.sub.C354 R.sup.D10 R.sup.D81 L.sub.C546 R.sup.D116 R.sup.D154
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L.sub.C744 R.sup.D133 R.sup.D147 L.sub.C169 R.sup.D169 R.sup.D169 L.sub.C361 R.sup.D10

R.sup.D118 L.sub.C553 R.sup.D143 R.sup.D18 L.sub.C745 R.sup.D133 R.sup.D149 L.sub.C170
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L.sub.C1096 R.sup.D9 R.sup.D196 L.sub.C773 R.sup.D197 R.sup.D197 L.sub.C881 R.sup.D1
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L.sub.C1102 R.sup.D9 R.sup.D202 L.sub.C779 R.sup.D203 R.sup.D203 L.sub.C887 R.sup.D1
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R.sup.D204 R.sup.D204 L.sub.C888 R.sup.D1 R.sup.D204 L.sub.C996 R.sup.D4 R.sup.D204
L.sub.C1104 R.sup.D9 R.sup.D204 L.sub.C781 R.sup.D205 R.sup.D205 L.sub.C889 R.sup.D1
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L.sub.C1369 R.sup.D143 R.sup.D199 L.sub.C1208 R.sup.D10 R.sup.D200 L.sub.C1262
R.sup.D55 R.sup.D200 L.sub.C1316 R.sup.D37 R.sup.D200 L.sub.C1370 R.sup.D143 R.sup.D200
L.sub.C1209 R.sup.D10 R.sup.D201 L.sub.C1263 R.sup.D55 R.sup.D201 L.sub.C1317 R.sup.D37
R.sup.D201 L.sub.C1371 R.sup.D143 R.sup.D201 L.sub.C1210 R.sup.D10 R.sup.D202
L.sub.C1264 R.sup.D55 R.sup.D202 L.sub.C1318 R.sup.D37 R.sup.D202 L.sub.C1372
R.sup.D143 R.sup.D202 L.sub.C1211 R.sup.D10 R.sup.D203 L.sub.C1265 R.sup.D55 R.sup.D203
L.sub.C1319 R.sup.D37 R.sup.D203 L.sub.C1373 R.sup.D143 R.sup.D203 L.sub.C1212
R.sup.D10 R.sup.D204 L.sub.C1266 R.sup.D55 R.sup.D204 L.sub.C1320 R.sup.D37 R.sup.D204
L.sub.C1374 R.sup.D143 R.sup.D204 L.sub.C1213 R.sup.D10 R.sup.D205 L.sub.C1267
R.sup.D55 R.sup.D205 L.sub.C1321 R.sup.D37 R.sup.D205 L.sub.C1375 R.sup.D143 R.sup.D205
L.sub.C1214 R.sup.D10 R.sup.D206 L.sub.C1268 R.sup.D55 R.sup.D206 L.sub.C1322 R.sup.D37
R.sup.D206 L.sub.C1376 R.sup.D143 R.sup.D206 L.sub.C1215 R.sup.D10 R.sup.D207
L.sub.C1269 R.sup.D55 R.sup.D207 L.sub.C1323 R.sup.D37 R.sup.D207 L.sub.C1377
R.sup.D143 R.sup.D207 L.sub.C1216 R.sup.D10 R.sup.D208 L.sub.C1270 R.sup.D55 R.sup.D208
L.sub.C1324 R.sup.D37 R.sup.D208 L.sub.C1378 R.sup.D143 R.sup.D208 L.sub.C1217
R.sup.D10 R.sup.D209 L.sub.C1271 R.sup.D55 R.sup.D209 L.sub.C1325 R.sup.D37 R.sup.D209
L.sub.C1379 R.sup.D143 R.sup.D209 L.sub.C1218 R.sup.D10 R.sup.D210 L.sub.C1272
R.sup.D55 R.sup.D210 L.sub.C1326 R.sup.D37 R.sup.D210 L.sub.C1380 R.sup.D143 R.sup.D210
L.sub.C1219 R.sup.D10 R.sup.D211 L.sub.C1273 R.sup.D55 R.sup.D211 L.sub.C1327 R.sup.D37
R.sup.D211 L.sub.C1381 R.sup.D143 R.sup.D211 L.sub.C1220 R.sup.D10 R.sup.D212
L.sub.C1274 R.sup.D55 R.sup.D212 L.sub.C1328 R.sup.D37 R.sup.D212 L.sub.C1382
R.sup.D143 R.sup.D212 L.sub.C1221 R.sup.D10 R.sup.D213 L.sub.C1275 R.sup.D55 R.sup.D213
L.sub.C1329 R.sup.D37 R.sup.D213 L.sub.C1383 R.sup.D143 R.sup.D213 L.sub.C1222
R.sup.D10 R.sup.D214 L.sub.C1276 R.sup.D55 R.sup.D214 L.sub.C1330 R.sup.D37 R.sup.D214
L.sub.C1384 R.sup.D143 R.sup.D214 L.sub.C1223 R.sup.D10 R.sup.D215 L.sub.C1277
R.sup.D55 R.sup.D215 L.sub.C1331 R.sup.D37 R.sup.D215 L.sub.C1385 R.sup.D143 R.sup.D215
L.sub.C1224 R.sup.D10 R.sup.D216 L.sub.C1278 R.sup.D55 R.sup.D216 L.sub.C1332 R.sup.D37
R.sup.D216 L.sub.C1386 R.sup.D143 R.sup.D216 L.sub.C1225 R.sup.D10 R.sup.D217
L.sub.C1279 R.sup.D55 R.sup.D217 L.sub.C1333 R.sup.D37 R.sup.D217 L.sub.C1387
R.sup.D143 R.sup.D217 L.sub.C1226 R.sup.D10 R.sup.D218 L.sub.C1280 R.sup.D55 R.sup.D218
L.sub.C1334 R.sup.D37 R.sup.D218 L.sub.C1388 R.sup.D143 R.sup.D218 L.sub.C1227
R.sup.D10 R.sup.D219 L.sub.C1281 R.sup.D55 R.sup.D219 L.sub.C1335 R.sup.D37 R.sup.D219
L.sub.C1389 R.sup.D143 R.sup.D219 L.sub.C1228 R.sup.D10 R.sup.D220 L.sub.C1282
R.sup.D55 R.sup.D220 L.sub.C1336 R.sup.D37 R.sup.D220 L.sub.C1390 R.sup.D143 R.sup.D220
L.sub.C1229 R.sup.D10 R.sup.D221 L.sub.C1283 R.sup.D55 R.sup.D221 L.sub.C1337 R.sup.D37
R.sup.D221 L.sub.C1391 R.sup.D143 R.sup.D221 L.sub.C1230 R.sup.D10 R.sup.D222
L.sub.C1284 R.sup.D55 R.sup.D222 L.sub.C1338 R.sup.D37 R.sup.D222 L.sub.C1392
R.sup.D143 R.sup.D222 L.sub.C1231 R.sup.D10 R.sup.D223 L.sub.C1285 R.sup.D55 R.sup.D223

L.sub.C1339 R.sup.D37 R.sup.D223 L.sub.C1393 R.sup.D143 R.sup.D223 L.sub.C1232 R.sup.D10 R.sup.D224 L.sub.C1286 R.sup.D55 R.sup.D224 L.sub.C1340 R.sup.D37 R.sup.D224 L.sub.C1394 R.sup.D143 R.sup.D224 L.sub.C1233 R.sup.D10 R.sup.D225 L.sub.C1287 R.sup.D55 R.sup.D225 L.sub.C1341 R.sup.D37 R.sup.D225 L.sub.C1395 R.sup.D143 R.sup.D225 L.sub.C1234 R.sup.D10 R.sup.D226 L.sub.C1288 R.sup.D55 R.sup.D226 L.sub.C1342 R.sup.D37 R.sup.D226 L.sub.C1396 R.sup.D143 R.sup.D226 L.sub.C1235 R.sup.D10 R.sup.D227 L.sub.C1289 R.sup.D55 R.sup.D227 L.sub.C1343 R.sup.D37 R.sup.D227 L.sub.C1397 R.sup.D143 R.sup.D227 L.sub.C1236 R.sup.D10 R.sup.D228 L.sub.C1290 R.sup.D55 R.sup.D228 L.sub.C1344 R.sup.D37 R.sup.D228 L.sub.C1398 R.sup.D143 R.sup.D228 L.sub.C1237 R.sup.D10 R.sup.D229 L.sub.C1291 R.sup.D55 R.sup.D229 L.sub.C1345 R.sup.D37 R.sup.D229 L.sub.C1399 R.sup.D143 R.sup.D229 L.sub.C1238 R.sup.D10 R.sup.D230 L.sub.C1292 R.sup.D55 R.sup.D230 L.sub.C1346 R.sup.D37 R.sup.D230 L.sub.C1400 R.sup.D143 R.sup.D230 L.sub.C1239 R.sup.D10 R.sup.D231 L.sub.C1293 R.sup.D55 R.sup.D231 L.sub.C1347 R.sup.D37 R.sup.D231 L.sub.C1401 R.sup.D143 R.sup.D231 L.sub.C1240 R.sup.D10 R.sup.D232 L.sub.C1294 R.sup.D55 R.sup.D232 L.sub.C1348 R.sup.D37 R.sup.D232 L.sub.C1402 R.sup.D143 R.sup.D232 L.sub.C1241 R.sup.D10 R.sup.D233 L.sub.C1295 R.sup.D55 R.sup.D233 L.sub.C1349 R.sup.D37 R.sup.D233 L.sub.C1403 R.sup.D143 R.sup.D233 L.sub.C1242 R.sup.D10 R.sup.D234 L.sub.C1296 R.sup.D55 R.sup.D234 L.sub.C1350 R.sup.D37 R.sup.D234 L.sub.C1404 R.sup.D143 R.sup.D234 L.sub.C1243 R.sup.D10 R.sup.D235 L.sub.C1297 R.sup.D55 R.sup.D235 L.sub.C1351 R.sup.D37 R.sup.D235 L.sub.C1405 R.sup.D143 R.sup.D235 L.sub.C1244 R.sup.D10 R.sup.D236 L.sub.C1298 R.sup.D55 R.sup.D236 L.sub.C1352 R.sup.D37 R.sup.D236 L.sub.C1406 R.sup.D143 R.sup.D236 L.sub.C1245 R.sup.D10 R.sup.D237 L.sub.C1299 R.sup.D55 R.sup.D237 L.sub.C1353 R.sup.D37 R.sup.D237 L.sub.C1407 R.sup.D143 R.sup.D237 L.sub.C1246 R.sup.D10 R.sup.D238 L.sub.C1300 R.sup.D55 R.sup.D238 L.sub.C1354 R.sup.D37 R.sup.D238 L.sub.C1408 R.sup.D143 R.sup.D238 L.sub.C1247 R.sup.D10 R.sup.D239 L.sub.C1301 R.sup.D55 R.sup.D239 L.sub.C1355 R.sup.D37 R.sup.D239 L.sub.C1409 R.sup.D143 R.sup.D239 L.sub.C1248 R.sup.D10 R.sup.D240 L.sub.C1302 R.sup.D55 R.sup.D240 L.sub.C1356 R.sup.D37 R.sup.D240 L.sub.C1410 R.sup.D143 R.sup.D240 L.sub.C1249 R.sup.D10 R.sup.D241 L.sub.C1303 R.sup.D55 R.sup.D241 L.sub.C1357 R.sup.D37 R.sup.D241 L.sub.C1411 R.sup.D143 R.sup.D241 L.sub.C1250 R.sup.D10 R.sup.D242 L.sub.C1304 R.sup.D55 R.sup.D242 L.sub.C1358 R.sup.D37 R.sup.D242 L.sub.C1412 R.sup.D143 R.sup.D242 L.sub.C1251 R.sup.D10 R.sup.D243 L.sub.C1305 R.sup.D55 R.sup.D243 L.sub.C1359 R.sup.D37 R.sup.D243 L.sub.C1413 R.sup.D143 R.sup.D243 L.sub.C1252 R.sup.D10 R.sup.D244 L.sub.C1306 R.sup.D55 R.sup.D244 L.sub.C1360 R.sup.D37 R.sup.D244 L.sub.C1414 R.sup.D143 R.sup.D244 L.sub.C1253 R.sup.D10 R.sup.D245 L.sub.C1307 R.sup.D55 R.sup.D245 L.sub.C1361 R.sup.D37 R.sup.D245 L.sub.C1415 R.sup.D143 R.sup.D245 L.sub.C1254 R.sup.D10 R.sup.D246 L.sub.C1308 R.sup.D55 R.sup.D246 L.sub.C1362 R.sup.D37 R.sup.D246 L.sub.C1416 R.sup.D143 R.sup.D246 wherein R.sup.D1 to R.sup.D246 have the following structures: ##STR00769## ##STR00770## ##STR00771## ##STR00772## ##STR00773## ##STR00774## ##STR00775## ##STR00776## ##STR00777## ##STR00778## ##STR00779## ##STR00780## ##STR00781## ##STR00782## ##STR00783## ##STR00784## ##STR00785## ##STR00786## ##STR00787## ##STR00788## ##STR00789## ##STR00790##

15. The compound of claim 1, wherein the compound is selected from the group consisting of: ##STR00791## ##STR00792## ##STR00793## ##STR00794## ##STR00795## ##STR00796## ##STR00797## ##STR00798## ##STR00799##

16. The compound of claim 11, wherein the compound has the Formula III: ##STR00800## wherein: M.sup.1 is Pd or Pt; moieties E and F are each independently monocyclic or polycyclic ring structure, wherein the monocyclic ring or each ring of the polycyclic fused ring system is independently a 5-membered to 10-membered carbocyclic or heterocyclic ring; Z.sup.3 and Z.sup.4 are each independently C or N; K, K.sup.3, and K.sup.4 are each independently selected from the

group consisting of a direct bond, O, and S, wherein at least two of them are direct bonds; L.sup.1, L.sup.2, and L.sup.3 are each independently absent or selected from the group consisting of a direct bond, BR, BRR′, NR, PR, P(O)R, O, S, Se, C═O, C═S, C═Se, C═NR, C═CRR′, S═O, SO.sub.2, CR, CRR′, SiRR′, GeRR′, alkylene, cycloalkyl, aryl, cycloalkylene, arylene, heteroarylene, and combinations thereof, wherein at least one of L.sup.1 and L.sup.2 is present; R.sup.E and R.sup.F each independently represents zero, mono, or up to a maximum allowed number of substitutions; each of R, R′, R.sup.E, and R.sup.F is independently a hydrogen or a substituent selected from the group consisting of deuterium, halide, alkyl, cycloalkyl, heteroalkyl, arylalkyl, alkoxy, aryloxy, amino, silyl, germyl, boryl, alkenyl, cycloalkenyl, heteroalkenyl, alkynyl, aryl, heteroaryl, acyl, carbonyl, carboxylic acid, ester, nitrile, isonitrile, sulfanyl, selenyl, sulfinyl, sulfonyl, phosphino, and combinations thereof; and two adjacent R.sup.A, R.sup.B, R.sup.C, R.sup.E, and R.sup.F can be joined or fused together to form a ring.

17. An organic light emitting device (OLED) comprising: an anode; a cathode; and an organic layer disposed between the anode and the cathode, wherein the organic layer comprises a compound according to claim 1.

18. The OLED of claim 17, wherein the host is selected from the group consisting of: ##STR00801## ##STR00802## ##STR00803## ##STR00804## ##STR00805## ##STR00806## ##STR00807## ##STR00808## ##STR00809## ##STR00810## ##STR00811## ##STR00812## ##STR00813## ##STR00814## ##STR00815## ##STR00816## ##STR00817## ##STR00818## wherein: each of J.sub.1 to J.sub.6 is independently C or N; L′ is a direct bond or an organic linker; each Y.sup.AA, Y.sup.BB, Y.sup.CC, and Y.sup.DD is independently selected from the group consisting of absent a bond, direct bond, O, S, Se, CRR′, SiRR′, GeRR′, NR, BR, BRR′; each of R.sup.A′, R.sup.B′, R.sup.C′, R.sup.D′, R.sup.E′, R.sup.F′, and R.sup.G′ independently represents mono, up to the maximum substitutions, or no substitutions; each R, R′, R.sup.A′, R.sup.B′, R.sup.C′, R.sup.D′, R.sup.E′, R.sup.F′, and R.sup.G′ is independently a hydrogen or a substituent selected from the group consisting of deuterium, halogen, alkyl, cycloalkyl, heteroalkyl, heterocycloalkyl, arylalkyl, alkoxy, aryloxy, amino, silyl, germyl, boryl, alkenyl, cycloalkenyl, heteroalkenyl, alkynyl, aryl, heteroaryl, acyl, carboxylic acid, ether, ester, nitrile, isonitrile, sulfanyl, selenyl, sulfinyl, sulfonyl, phosphino, and combinations thereof; any two substituents can be joined or fused to form a ring; and where possible, each unsubstituted aromatic carbon atom is optionally replaced with N to form an aza-substituted ring.

19. The OLED of claim 17, wherein the compound is a sensitizer, and the OLED further comprises an acceptor selected from the group consisting of a fluorescent emitter, a delayed fluorescence emitter, and combination thereof.

20. A consumer product comprising an organic light-emitting device comprising: an anode; a cathode; and an organic layer disposed between the anode and the cathode, wherein the organic layer comprises a compound according to claim 1.