

IN THIS ISSUE

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Cover

See San-Yuan Chen *et al.*, pp. 11291–11294.
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See Colin L. Raston *et al.*,
pp. 11295–11298.
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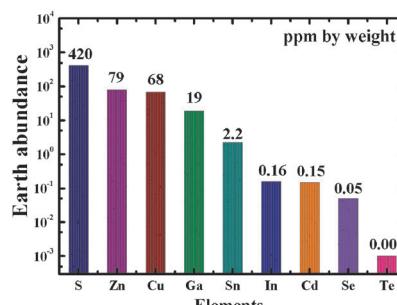
FEATURE ARTICLES

11258

Towards environmentally benign approaches for the synthesis of CZTSSe nanocrystals by a hot injection method: a status review

Uma Ghorpade, Mahesh Suryawanshi, Seung Wook Shin, Kishor Gurav, Pramod Patil, Sambhaji Pawar, Chang Woo Hong, Jin Hyeok Kim* and Sanjay Kolekar*

With the earth's abundance of kesterite, recent progress in chalcogenide based $\text{Cu}_2\text{ZnSn}(\text{S}_x,\text{Se}_{1-x})_4$ (CZTSSe) thin films has drawn prime attention in thin film solar cell (TFSC) research and development.

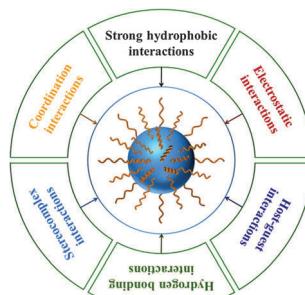


11274

Noncovalent interaction-assisted polymeric micelles for controlled drug delivery

Jianxun Ding, Linghui Chen, Chunsheng Xiao, Li Chen, Xiuli Zhuang and Xuesi Chen*

Various individual or synergistic noncovalent interactions were employed to mediate polymeric micelles for controlled drug delivery.



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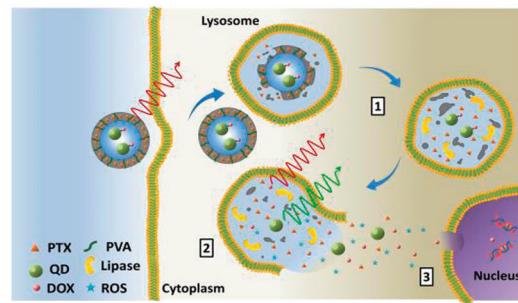
COMMUNICATIONS

11291

Synergistic combination therapy using a lipid shell–droplet core nanosphere with tunable thickness

Chia-Wei Su, Ting-Hsi Fan, Wei-Ming Li and San-Yuan Chen*

A combinational drug delivery carrier composed of an internal droplet core and a thickness-controllable shell was developed to co-deliver paclitaxel, doxorubicin and quantum dots simultaneously for acting on different biological signaling pathways synergistically and achieving *in vitro* fluorescence imaging, chemotherapeutic and oxidation therapy.

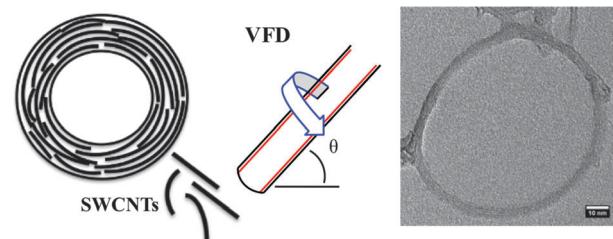


11295

Shear induced fabrication of intertwined single walled carbon nanotube rings

Kasturi Vimalanathan, Xianjue Chen and Colin L. Raston*

Stable nanorings of SWCNTs devoid of surfactants are accessible by combining liquid–liquid interfacial tension and mechanoenergy within an energy efficient thin film microfluidic vortex fluidic device (VFD).

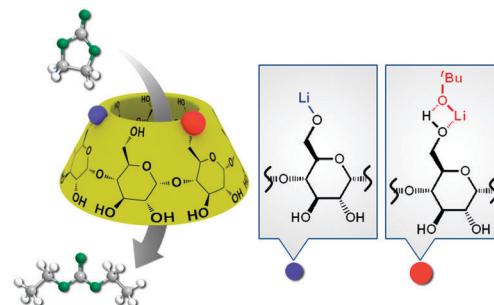


11299

Fabrication of solid strong bases with a molecular-level dispersion of lithium sites and high basic catalytic activity

Lin-Bing Sun,* Jie Shen, Feng Lu, Xiao-Dan Liu, Li Zhu and Xiao-Qin Liu

Cyclodextrin-supported lithium prepared at room temperature exhibits a molecular-level dispersion of basic sites and high activity in transesterification reactions.

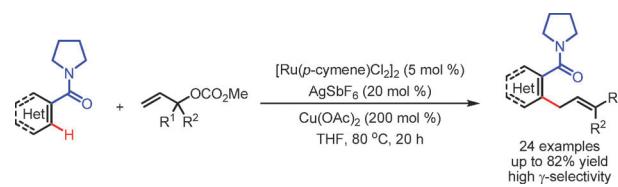


11303

Direct allylation of aromatic and α,β -unsaturated carboxamides under ruthenium catalysis

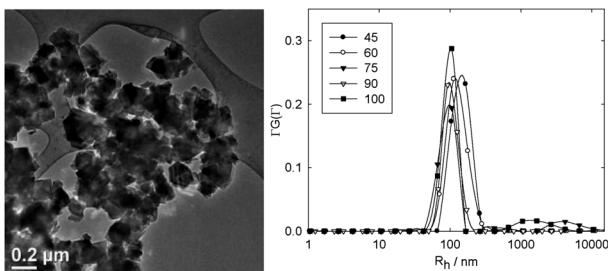
Mirim Kim, Satyasheel Sharma, Neeraj Kumar Mishra, Sangil Han, Jihye Park, Minyoung Kim, Youngmi Shin, Jong Hwan Kwak, Sang Hoon Han and In Su Kim*

The ruthenium-catalyzed oxidative allylation of aromatic and α,β -unsaturated carboxamides with allylic carbonates is described.

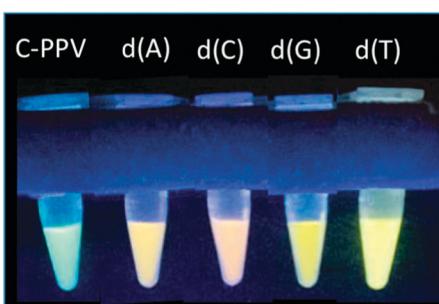


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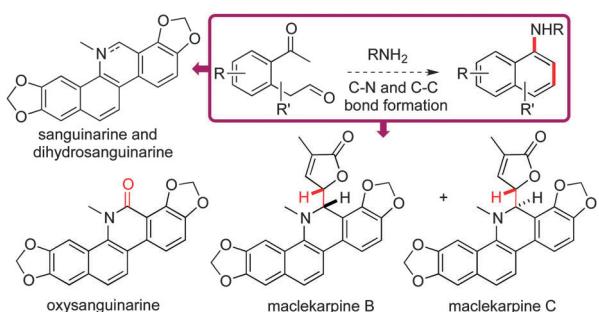
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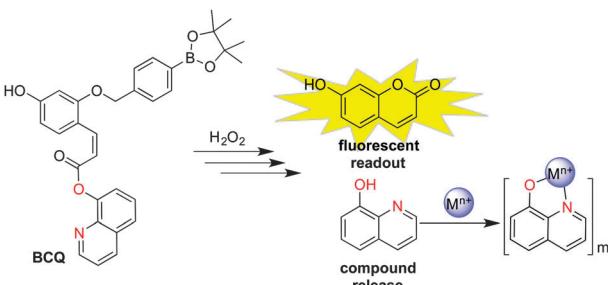
11311



11314



11317

**Size tunable synthesis of solution processable diamond nanocrystals**

Manik Mandal, Fadi Haso, Tianbo Liu, Yingwei Fei and Kai Landskron*

Size tunable synthesis of solution processable diamond nanocrystals is reported.

DNA sequence-dependent photoluminescence enhancement in a cationic conjugated polyelectrolyte

Zhongwei Liu, Hsing-Lin Wang* and Mircea Cotlet*

A cationic conjugated polyelectrolyte complexed with single stranded DNA experiences sequence dependent photoluminescence enhancement.

New methods for the synthesis of naphthyl amines; application to the synthesis of dihydrosanguinarine, sanguinarine, oxysanguinarine and (\pm)-maclekarpines B and C

Matthew R. Tatton, Iain Simpson and Timothy J. Donohoe*

A new method for preparing naphthyl amines is described and then used in the syntheses of several benzo[c]phenanthridine natural products.

A prochelator with a modular masking group featuring hydrogen peroxide activation with concurrent fluorescent reporting

Andrew T. Franks and Katherine J. Franz*

Prochelator BCQ incorporates chemical stimulus response, fluorescent reporting and active compound release in a single structure.

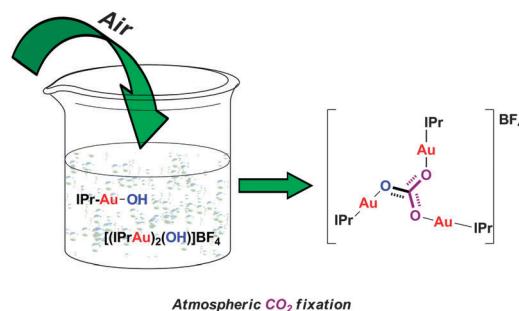
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11321

Trapping atmospheric CO₂ with gold

Alba Collado, Adrián Gómez-Suárez, Paul B. Webb, Hedi Kruger, Michael Bühl, David B. Cordes, Alexandra M. Z. Slawin and Steven P. Nolan*

The ability of gold-hydroxides to fix CO₂ is reported. [Au(IPr)(OH)] and [{(Au(IPr))₂(μ-OH)}][BF₄] react with atmospheric CO₂ to form the trigold carbonate complex [{Au(IPr)}₃(μ³-CO₃)][BF₄].

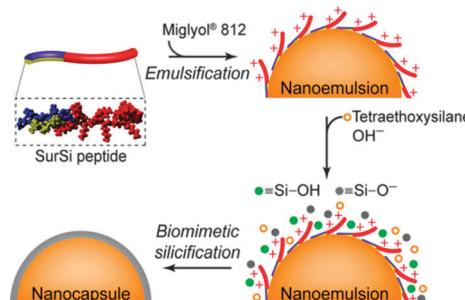


11325

Emulsion-templated silica nanocapsules formed using bio-inspired silicification

David Wibowo, Chun-Xia Zhao and Anton P. J. Middelberg*

A designed bifunctional peptide is developed to stabilize nanoemulsion core and form silica shell, with tunable thickness, encapsulating the oil core under environmentally-friendly conditions.

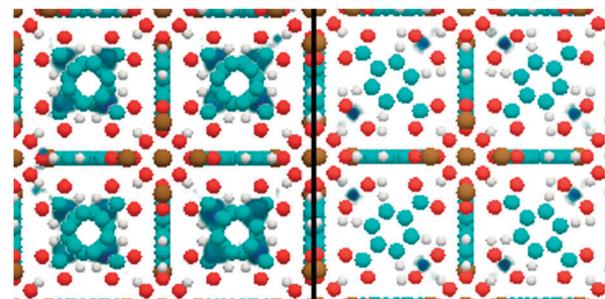


11329

Water adsorption in UiO-66: the importance of defects

Pritha Ghosh, Yamil J. Colón and Randall Q. Snurr*

Density distributions of water in an ideal UiO-66 unit cell (left) and a unit cell missing linkers (right).

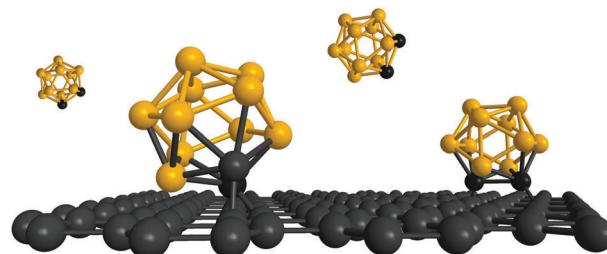


11332

Carborane functionalization of the aromatic network in chemically-synthesized graphene

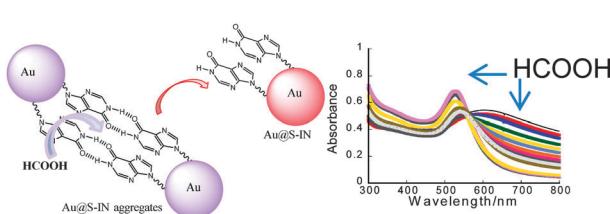
Jan U. Kahlert, Aditya Rawal, James M. Hook, Louis M. Rendina* and Mohammad Choucair*

The conjugated aromatic system of graphene trapping the boron rich 1,2-carborane cluster.



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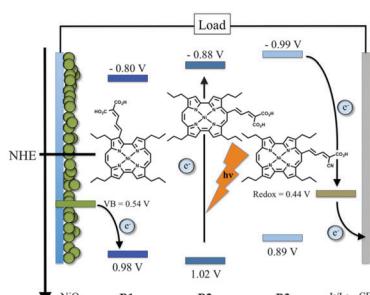
11335

**A tailor-made nucleoside-based colourimetric probe of formic acid**

Julie P. Vanegas, Elena Zaballos-García and Julia Pérez-Prieto*

A ratiometric, specific probe of formic acid has been developed.

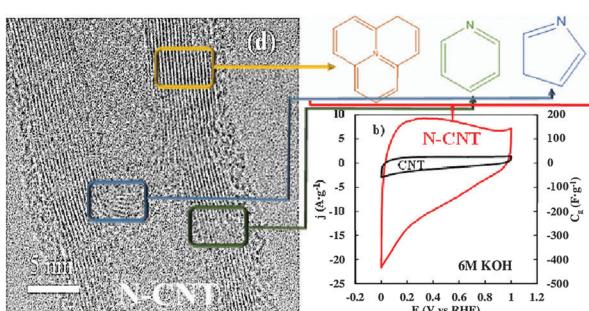
11339

**Integrating metalloporphycenes into p-type NiO-based dye-sensitized solar cells**

Sebastian Feihl, Rubén D. Costa,* Wolfgang Brenner, Johannes T. Margraf, Rubén Casillas, Oliver Langmar, Anne Browa, Tatjana E. Shubina, Timothy Clark, Norbert Jux and Dirk M. Guldi*

In the current work, we have explored a novel synthetic route towards metalated porphycenes and their use in p-type NiO-based dye-sensitized solar cells.

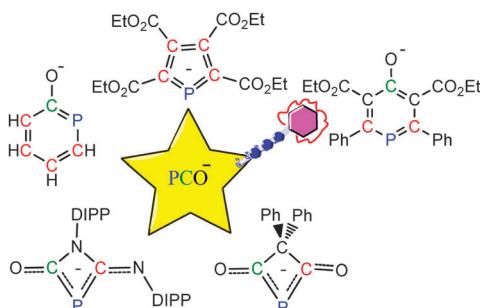
11343

**On the origin of the high capacitance of nitrogen-containing carbon nanotubes in acidic and alkaline electrolytes**

O. Ornelas, J. M. Sieben, R. Ruiz-Rosas, E. Morallón, D. Cazorla-Amorós,* J. Geng,* N. Soin, E. Siores and B. F. G. Johnson

The preparation of nitrogenated carbon nanotubes (N-CNT) using pyridine as a carbon precursor resulted in an eight-times increase in gravimetric capacitance.

11347

**The phosphphaethynolate anion reacts with unsaturated bonds: DFT investigations into [2+2], [3+2] and [4+2] cycloadditions**

Liu Liu, Jun Zhu* and Yufen Zhao*

Density functional theory calculations were carried out to investigate the [2+2], [3+2] and [4+2] cycloadditions of the phosphphaethynolate anion.

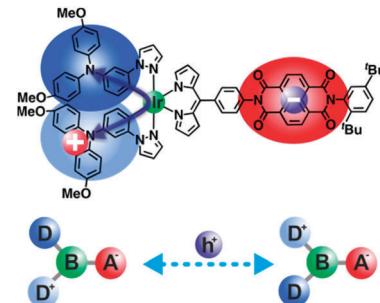
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11350

A photoinduced mixed-valence state in an organic bis-triarylamine mixed-valence compound with an iridium-metal-bridge

C. Lambert,* R. Wagener, J. H. Klein, G. Grelaud, M. Moos, A. Schmiedel, M. Holzapfel and T. Bruhn

A cyclometalated iridium complex serves as a bridge between two triarylamine donors in an organic mixed-valence compound that is produced by a photoinduced electron transfer process.

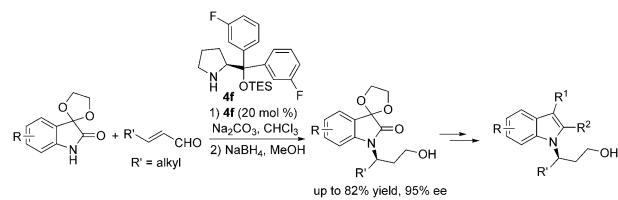


11354

Enantioselective *N*-alkylation of isatins and synthesis of chiral *N*-alkylated indoles

Xiaowei Dou, Weijun Yao, Chunhui Jiang and Yixin Lu*

Asymmetric *N*-alkylations of isatins with enals were shown to be feasible *via* a prolinol-catalyzed iminium activation, and *N*-alkylated isatins and indoles were obtained in good yields and with excellent enantioselectivity.

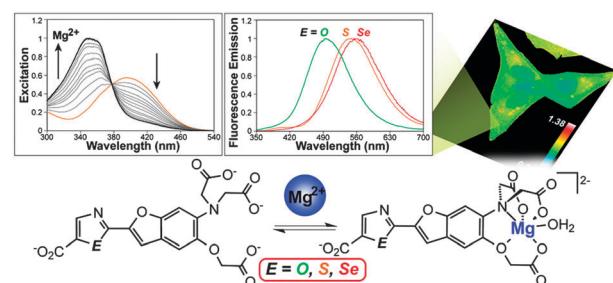


11358

Enhanced ratiometric fluorescent indicators for magnesium based on azoles of the heavier chalcogens

Mohammad S. Afzal, Jean-Philippe Pitteloud and Daniela Buccella*

Replacement of a single atom by sulfur or selenium affords fluorescent sensors with improved optical properties for ratiometric intracellular Mg²⁺ imaging.

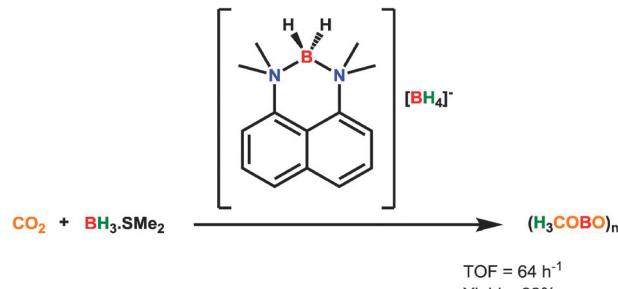


11362

Lewis base activation of borane–dimethylsulfide into strongly reducing ion pairs for the transformation of carbon dioxide to methoxyboranes

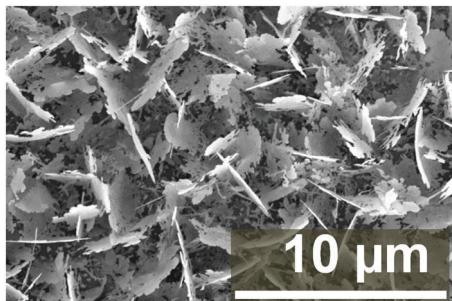
Marc-André Légaré, Marc-André Courtemanche and Frédéric-Georges Fontaine*

The hydroboration of carbon dioxide into methoxyboranes by borane–dimethylsulfide using different base catalysts, including notably non-nucleophilic proton sponge, is described.



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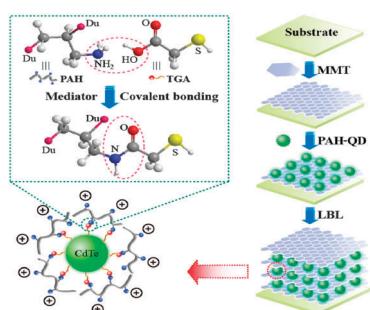


Spray pyrolysis of CZTS nanoplatelets

S. Exarhos, K. N. Bozhilov and L. Mangolini*

CZTS nanoplatelets have been grown using spray pyrolysis of a mixture of copper-, zinc- and tin-diethyldithiocarbamate as precursors.

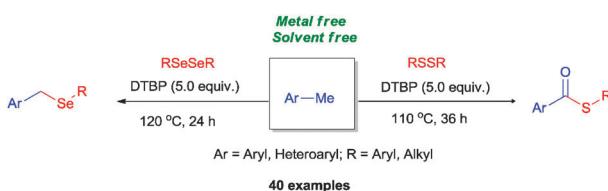
11370

Covalent linking of quantum dots to polymer for inorganic–inorganic luminescence films *via* layer-by-layer assembly with clay

Wenjuan Zhou, Weijiang Guan and Chao Lu*

Polyamine modified-QDs by covalent bonds were incorporated into MMT nanosheets to obtain inorganic–inorganic luminescence films.

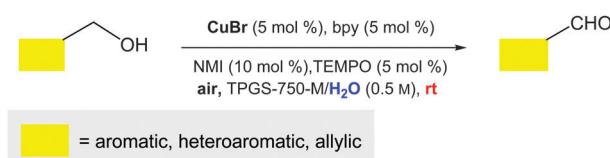
11374

Metal-free sp^3 C–H functionalization: a novel approach for the syntheses of selenide ethers and thioesters from methyl arenes

Satpal Singh Badsara, Yi-Chen Liu, Ping-An Hsieh, Jing-Wen Zeng, Shao-Yi Lu, Yi-Wei Liu and Chin-Fa Lee*

A DTBP-promoted, operationally simple, metal-free and solvent-free formation of C–Se and C–S bonds through sp^3 C–H functionalization of methyl arenes with diselenides and disulfides is described.

11378



Selective oxidations of activated alcohols in water at room temperature

B. H. Lipshutz,* M. Hageman, J. C. Fennewald, R. Linstadt, E. Slack and K. Voigtlander

Oxidations of activated alcohols can be achieved in aqueous nanoreactors at room temperature using air as the stoichiometric oxidant.

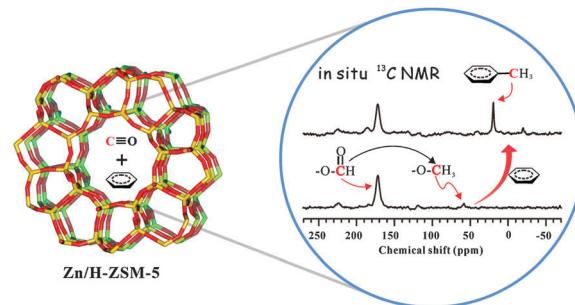
COMMUNICATIONS

11382

Alkylation of benzene with carbon monoxide over Zn/H-ZSM-5 zeolite studied using *in situ* solid-state NMR spectroscopy

Xiumei Wang, Jun Xu,* Guodong Qi, Chao Wang, Qiang Wang and Feng Deng*

Alkylation of benzene with CO produces toluene over a Zn/H-ZSM-5 zeolite, in which CO provides the methyl group of toluene via a methoxy intermediate.

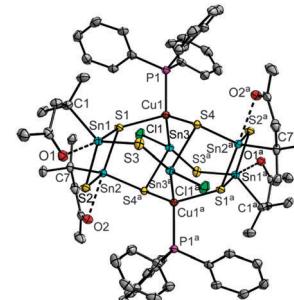


11385

Bronze, silver and gold: functionalized group 11 organotin sulfide clusters

Jens P. Eußner and Stefanie Dehnken*

The synthesis, properties and reactivity of group 11 organotin sulfide clusters $[(R^1\text{Sn})_4(\text{SnCl})_2(\text{MPPPh}_3)_2\text{S}_8]$ ($\text{M} = \text{Cu, Ag}$), $[(R^3\text{Sn})_{10}\text{Ag}_{10}\text{S}_{20}]$, and $[(R^{1,3}\text{Sn})_2(\text{AuPPh}_3)_2\text{S}_4]$ with covalently bound, carbonyl or hydrazine-terminated ligands $R^1 = \text{CMe}_2\text{CH}_2\text{C}(\text{Me})\text{O}$ or $R^3 = \text{CMe}_2\text{CH}_2\text{C}(\text{Me})\text{NNH}_2$ are reported.



11389

Multicomponent reactions involving phosphines, arynes and aldehydes

Anup Bhunia, Trinadh Kaicharla, Digvijay Porwal, Rajesh G. Gonnade and Akkattu T. Biju*

A multicomponent reaction involving phosphines, arynes, and aldehydes is reported. The reaction proceeds via the generation of a 1,3-zwitterionic intermediate between phosphines and arynes, which is intercepted by aldehydes in a [3+2] mode, allowing the rapid synthesis of functionalized benzoxaphospholes.

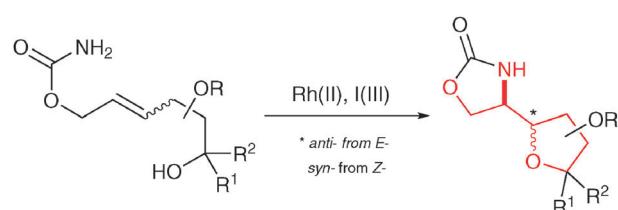


11393

Rhodium(II)-catalysed tandem aziridination and ring-opening: stereoselective synthesis of functionalised tetrahydrofurans

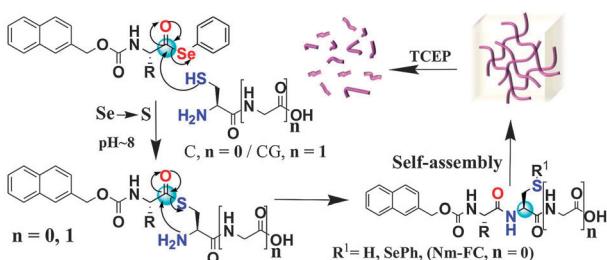
William P. Unsworth, Nicola Clark, Thomas O. Ronson, Kiri Stevens, Amber L. Thompson, Scott G. Lamont and Jeremy Robertson*

Rh(II) mediated tandem aziridination and cycloetherification achieves a direct, stereoselective synthesis of the 2-(1-amino-2-hydroxyethyl)tetrahydrofuran motif.



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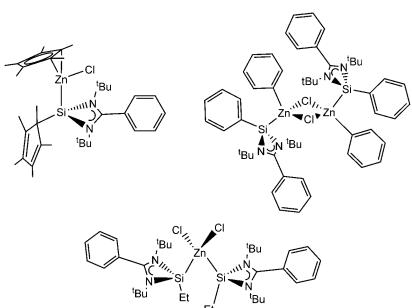
11397

*In situ* generation of redox active peptides driven by selenoester mediated native chemical ligation

Dnyaneshwar B. Rasale, Indrajit Maity and Apurba K. Das*

Redox active peptides synthesized via selenoester mediated native chemical ligation with a propensity to self-assemble in aqueous medium. A gel-sol transition of self-assembled peptide in a reducing environment makes it a versatile candidate for the development of functional biomaterials.

11401

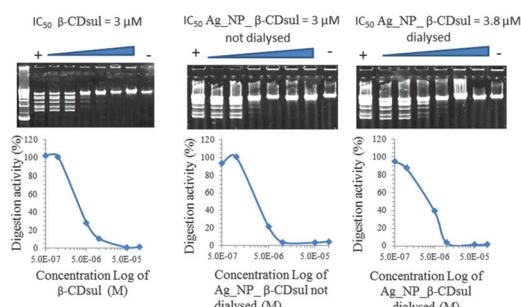


Zinc–silylene complexes

Sebastian Schäfer, Ralf Köppe, Michael T. Gamer and Peter W. Roesky*

The first zinc–silylene complexes are reported.

11404

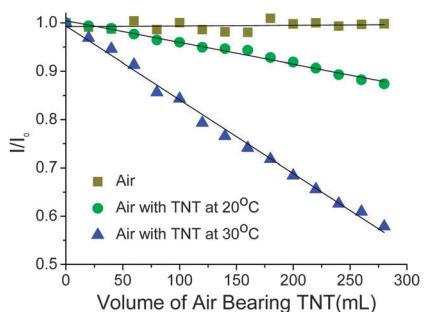


Large negatively charged organic host molecules as inhibitors of endonuclease enzymes

Yannick Tauran, Christophe Anjard, Beomjoon Kim, Moez Rhimi and Anthony W. Coleman*

Endonuclease enzymes can be inhibited in the micromolar range by sulphonated calix-arenes, sulphated cyclodextrin and sulphated cyclodextrin nanoparticles.

11407



Synthesis of tetraphenylethylene pillar[6]arenes and the selective fast quenching of their AIE fluorescence by TNT

Jin-Hua Wang, Hai-Tao Feng and Yan-Song Zheng*

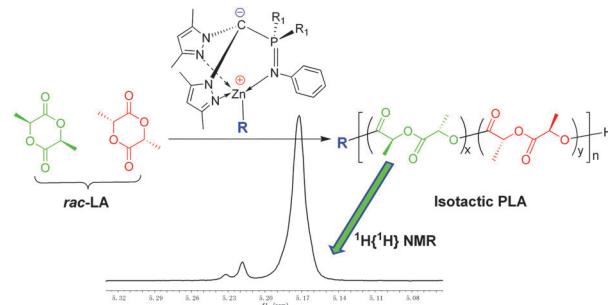
AIE fluorescence of tetraphenylethylene pillar[6]arenes could be selectively quenched by TNT, which could be used to detect TNT in air.

COMMUNICATIONS

11411

Isoselective ring-opening polymerization of *rac*-lactide initiated by achiral heteroscorpionate zwitterionic zinc complexes

Zehuai Mou, Bo Liu, Meiyang Wang, Hongyan Xie, Ping Li, Lei Li, Shihui Li and Dongmei Cui*
Achiral heteroscorpionate zinc complexes have been demonstrated as isoselective catalysts for the ring-opening polymerization of *rac*-lactide.

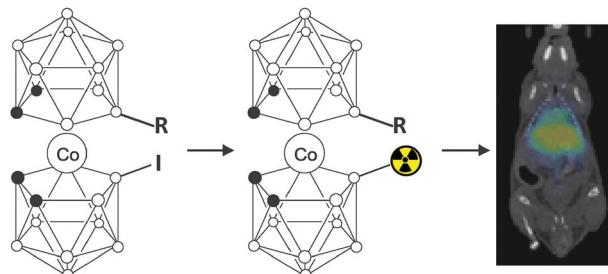


11415

COSAN as a molecular imaging platform: synthesis and “*in vivo*” imaging

Kiran B. Gona, Adnana Zaulet, Vanessa Gómez-Vallejo, Francesc Teixidor, Jordi Llop* and Clara Viñas*

The unprecedented radiolabelling of $[\text{Co}(8\text{-I-C}_2\text{B}_9\text{H}_{10})(\text{C}_2\text{B}_9\text{H}_{11})]^-$ with ^{124}I and ^{125}I : short cutting the pathway from bench to bed for boron carrier drugs.



11418

A half-sandwich organometallic single-ion magnet with hexamethylbenzene coordinated to the Dy^(III) ion

Shan-Shan Liu, Joseph W. Ziller, Yi-Quan Zhang, Bing-Wu Wang,* William J. Evans* and Song Gao*

The first example of a lanthanide(III)/π-bonded arene SIM $[(\text{C}_6\text{Me}_6)\text{Dy}(\text{AlCl}_4)_3]$ is reported and the π-bonded arene is dominant in determining the easy axis orientation shown by *ab initio* calculations.

