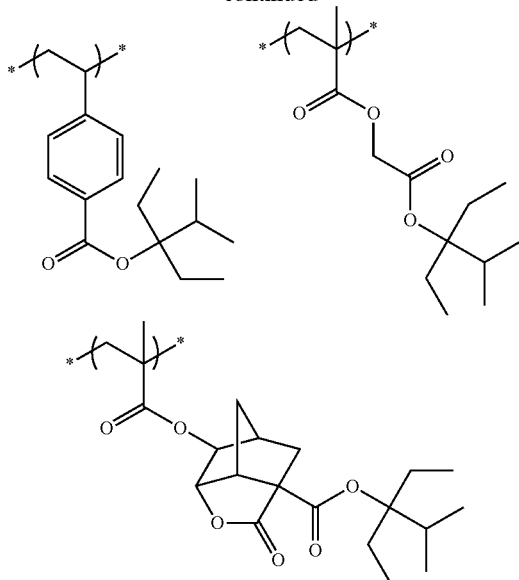


215

-continued



The content ratio of a repeating unit which is represented by General Formula (Ca2) described above in the resin (C) (the total thereof in a case of containing a plurality of types) is preferably 5 mol % to 80 mol % with respect to all of the repeating units in the resin (C), more preferably 5 mol % to 60 mol %, and even more preferably 10 mol % to 40 mol %.

In General Formula (Ca3), Ra is the same as Ra in General Formula (Ca2) and the specific examples and the preferable examples thereof are also the same.

L₂ is the same as L₁ in General Formula (Ca2) and the specific examples and the preferable examples thereof are also the same.

R₁₄, R₁₅, and R₁₆ each independently represent an alkyl group. Two of R₁₄ to R₁₆ may form a ring by linking with each other.

An alkyl group of R₁₄ to R₁₆ is preferably an alkyl group with 1 to 4 carbon atoms such as a methyl group, an ethyl group, an n-propyl group, an isopropyl group, an n-butyl group, an isobutyl group, and a t-butyl group.

A cycloalkyl group which is formed by two of R₁₄ to R₁₆ being bonded with each other is preferably a monocyclic cycloalkyl group such as a cyclopentyl group and a cyclohexyl group, or a polycyclic cycloalkyl group such as a norbornyl group, a tetracyclodecanyl group, a tetracyclodecanyl group, and adamantyl group. A monocyclic cycloalkyl group with 5 or 6 carbon atoms is particularly preferable.

Examples of one preferable aspect include an aspect in which R₁₄ is a methyl group or an ethyl group and R₁₅ and R₁₆ form the cycloalkyl group by bonding with each other.

Each of the groups may have a substituent group and examples of the substituent group include a hydroxyl group, a halogen atom (for example, a fluorine atom), an alkyl group (with 1 to 4 carbon atoms), a cycloalkyl group (with 3 to 8 carbon atoms), an alkoxy group (with 1 to 4 carbon atoms), a carboxyl group, an alkoxycarbonyl group (with 2 to 6 carbon atoms), and the like, and the number of carbon atoms is preferably 8 or less.

In General Formula (Ca4), Ra is the same as Ra in General Formula (Ca2) and the specific examples and the preferable examples thereof are also the same.

216

L₃ is the same as L₁ in General Formula (Ca2) and the specific examples and the preferable examples thereof are also the same.

AR represents an aryl group. Rn represents an alkyl group, a cycloalkyl group, or an aryl group. Rn and AR may form a non-aromatic ring by bonding with each other.

Specific examples and preferable examples of AR and Rn include the same as the specific examples and the preferable examples of AR and Rn in the repeating unit which is represented by General Formula (BZ) according to paragraphs [0101] to [0131] of JP2012-208447A and the contents thereof are included in the present specification.

Examples of a non-aromatic ring which Rn and AR may form by bonding with each other also include the same as the specific examples and the preferable examples of the non-aromatic ring which Rn and AR may form by bonding with each other in the repeating unit which is represented by General Formula (BZ) according to paragraphs [0101] to [0131] of JP2012-208447A and the contents thereof are included in the present specification.

In a case where the resin (C) has repeating units (Ca1) to (Ca4), the content (the total thereof in a case of containing a plurality of types) is preferably 5 mol % to 30 mol % based on all of the repeating units of the resin (C) and more preferably 10 mol % to 20 mol %.

Furthermore, the resin (C) may have at least one group selected from groups of (x) and (y) below.

(x) Acidic Groups

(y) Groups which have a Lactone Structure, Acid Anhydride Groups, or Acid Imide Groups

Examples of acidic groups (x) include a phenolic hydroxyl group, a carboxylic acid group, a fluorinated alcohol group, a sulfonic acid group, a sulfonamide group, a sulfonylimide group, an (alkyl sulfonyl) (alkyl carbonyl) methylene group, an (alkyl sulfonyl) (alkyl carbonyl) imide group, a bis(alkyl carbonyl)methylene group, a bis(alkyl carbonyl) imide group, a bis(alkyl sulfonyl)methylene group, a bis(alkyl sulfonyl)imide group, a tris(alkyl carbonyl)methylene group, a tris(alkyl sulfonyl)methylene group, and the like.

Examples of a preferable acidic group include a fluorinated alcohol group (preferably hexafluoroisopropanol), a sulfonimide group, a bis(alkyl carbonyl)methylene group.

Examples of a repeating unit which has an acidic group (x) include a repeating unit where an acidic group is directly bonded with a main chain of a resin such as a repeating unit using an acrylic acid and a methacrylic acid, a repeating unit where an acidic group is bonded with the main chain of a resin via a linking group, or the like, and furthermore, by using a polymerization initiator or a chain transfer agent which has an acidic group during polymerization, introduction is also possible to an end of a polymer chain, and any of these cases is preferable. A repeating unit which has an acidic group (x) may have at least one of a fluorine atom or a silicone atom.

The content of the repeating units which have an acidic group (x) is preferably 10 mol % or less with respect to all of the repeating units in the resin (C) and more preferably 5 mol % or less and the resin (C) preferably substantially does not have a repeating unit which has an acidic group (x) (ideally, the content of the repeating units which have an acidic group (x) is 0 mol % with respect to all of the repeating units in the resin (C), that is, there is no repeating unit which has an acidic group (x)).

Specific examples of the repeating unit which has an acidic group (x) will be shown below; however, the present