

groups such as phenylene and naphthylene; and tri- or tetravalent forms of the foregoing groups with one or two hydrogen atoms being eliminated.

**[0050]** The recurring unit (a) functions as a quencher due to the structure of an ammonium salt of a carboxylic acid having an iodine or bromine-substituted aromatic ring. In this sense, the base polymer may be referred to as a quencher-bound polymer. The quencher-bound polymer has the advantages of a remarkable acid diffusion-suppressing effect and improved resolution. In addition, since the recurring unit (a) contains iodine atom having high absorption or bromine atom having a high efficiency of electron emission, it generates secondary electrons to promote decomposition of the acid generator during exposure, leading to a high sensitivity. As a result, a high sensitivity, high resolution, and low LWR or improved CDU are achieved at the same time.

**[0051]** Iodine or bromine is less soluble in alkaline developer because of a relatively large atomic weight. When iodine or bromine is attached to the polymer backbone, a resist film in the exposed region is reduced in alkaline solubility, leading to losses of resolution and sensitivity and causing defect formation. When the recurring unit (a) is in an alkaline developer, the iodized or brominated carboxylic acid in recurring unit (a) forms a salt with an alkaline compound in the developer, leaving the polymer backbone. This ensures sufficient alkaline dissolution and minimizes defect formation.

[0052] Examples of the cation moiety in the monomer from which recurring units (a) are derived are shown below, but not limited thereto. Herein  $R^d$  is as defined above.

