excellent resolution and an excellent sensitivity. However, there is no disclosure regarding the adhesion to the substrate during development, and the application thereof to the black resin composition having a high optical density of the resin black matrix and containing a large number of pigment particles.

[0014]

On the other hand, Patent Document 6 discloses that, in the photosensitive resin composition containing pigments, a cured film after post-bake composed of a resin of copolymer having an oxetanyl group as a structural unit is effective in improving physical adhesion to a substrate. However, the disclosure is directed to the use of a copolymer, and no observation has been made regarding the adhesion to the substrate during development, and regarding the compatibility with a developer, which is often an issue in the black resin composition containing a large number of pigment particles.

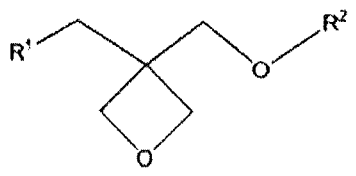
[0015]

Here, the present inventors have found that an addition of a specific oxetane compound in appropriate amount serves to solve the problems described above.

[0016]

Embodiments of the present invention are achieved by the following constitution.

According to a first aspect, there is provided a photosensitive black resin composition comprising at least a light-shielding material, an alkali-soluble resin, a photopolymerization initiator and a solvent, wherein the photosensitive black resin composition comprises at least an oxetane compound having a structure represented by General Formula (A) below as an additive, wherein the oxetane compound comprises a silyl group and wherein the amount of the oxetane compound contained in the composition is 1.5 to 10.0% by weight relative to the total amount of the light-shielding material and the alkali-soluble resin:

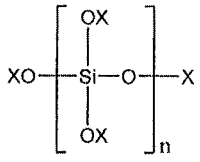


(A)

(wherein R^1 and R^2 may be the same or different; R^1 represents a hydrogen atom or an alkyl group having 1 to 10 carbon atoms, wherein the alkyl group may further comprise a substituent; and R^2 represents a hydrogen atom, a silyl group or an alkyl group having 1 to 10 carbon atoms, wherein the silyl group and the alkyl group may further comprise a substituent).

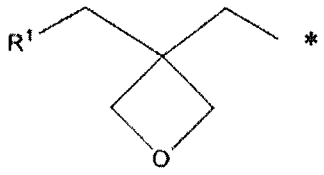
~~In an embodiment, the oxetane compound comprises a silyl group.~~

In an embodiment, the oxetane compound is represented by Structural Formula (B) below;



(B)

~~(~~wherein X represents the oxetane compound below and n represents a natural number of 10 or less~~)~~



(X)

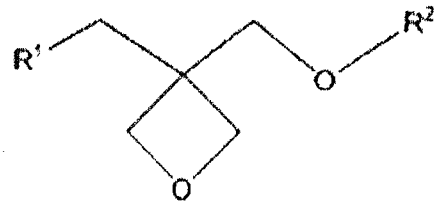
~~(~~wherein * represents a linking site; and R^1 represents a hydrogen atom or an alkyl group having 1 to 10 carbon atoms, wherein the alkyl group may further comprise a substituent~~)~~.

According to a second aspect, there is provided a resin black matrix substrate obtained by applying the above photosensitive black resin composition on a transparent substrate and then by forming a pattern.

EFFECT OF THE INVENTION

CLAIMS

1. A photosensitive black resin composition comprising at least a light-shielding material, an alkali-soluble resin, a photopolymerization initiator and a solvent, wherein said photosensitive black resin composition comprises at least an oxetane compound having a structure represented by General Formula (A) below as an additive, wherein said oxetane compound comprises a silyl group and wherein the amount of said oxetane compound contained in said composition is 1.5 to 10.0% by weight relative to the total amount of the light-shielding material and the alkali-soluble resin:

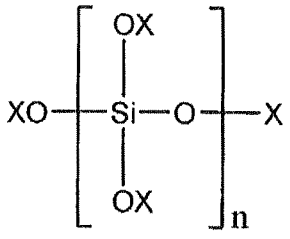


(A)

(wherein R^1 and R^2 may be the same or different; R^1 represents a hydrogen atom or an alkyl group having 1 to 10 carbon atoms, wherein the alkyl group may further comprise a substituent; and R^2 represents a hydrogen atom, a silyl group or an alkyl group having 1 to 10 carbon atoms, wherein the silyl group and the alkyl group may further comprise a substituent).

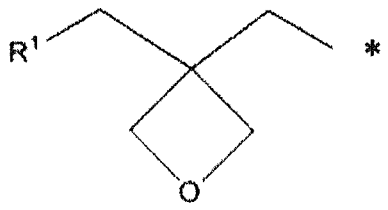
~~2. The photosensitive black resin composition according to claim 1, wherein said oxetane compound comprises a silyl group.~~

~~3~~2. The photosensitive black resin composition according to claim 1 ~~or 2~~, wherein said oxetane compound is represented by Structural Formula (B) below:



(B)

~~(~~ wherein X represents the oxetane compound below and n represents a natural number of 10 or less ~~)~~



(X)

~~(~~ wherein * represents a linking site; and R^1 represents a hydrogen atom or an alkyl group having 1 to 10 carbon atoms, wherein the alkyl group may further comprise a substituent~~)~~.

43. A resin black matrix substrate obtained by applying the photosensitive black resin composition according to ~~any one of claims 1 to 3~~ claim 1 or 2 on a transparent substrate and then by forming a pattern.