Accordingly, an object of the embodiments disclosed herein is to provide a negative type colored photosensitive resin composition that is high in heat resistance and able to serve for producing a cured film having a forward tapered shape.

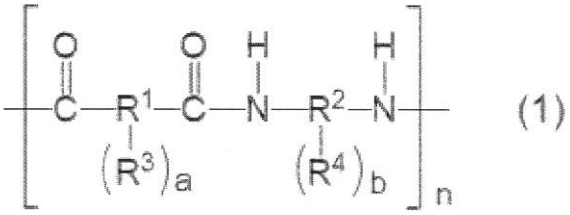
Means of Solving the Problems

[0012]

The present disclosure relates to a negative type colored photosensitive resin composition including an alkali-soluble resin (A), a photo initiator (B), a photo polymerizable compound (C), and a coloring agent (D), the alkali-soluble resin (A) containing a polyimide precursor, polybenzoxazole precursor, and/or a copolymer thereof (A-1), each resin (A-1) having a trifluoromethyl group in the backbone chain.

[0012a]

In an aspect, there is provided a negative type colored photosensitive resin composition comprising an alkali-soluble resin (A), a photo initiator (B), a photo polymerizable compound (C), and a coloring agent (D), the alkali-soluble resin (A) containing a polyimide precursor, polybenzoxazole precursor, and/or a copolymer thereof (A-1), each resin (A-1) having a trifluoromethyl group in the backbone chain, wherein the coloring agent (D) contains a benzofuranone based black pigment and/or a perylene based black pigment, wherein the resin (A-1) contains a structure as represented by the undermentioned general formula (1) as primary component:



(1)

wherein R^1 and R^2 in general formula (1) independently denote a divalent to octavalent organic groups; R^3 and R^4 each denote a phenolic hydroxyl group, sulfonic acid group, thiol group, or $COOR^5$, which may be contained singly or different ones of which coexist; R^5 denotes a hydrogen atom or a monovalent hydrocarbon group having 1 to 20 carbon atoms; a and b each denote an integer of 0 to 6, where a+b > 0; n denotes the range of 5 to 10,000; and at least one of the groups represented by R^1-$(R^3)_a$ and those by R^2-$(R4)_b$ contains a trifluoromethyl group.

[0012b]

In another aspect, there is provided a cured film produced from a negative type colored photosensitive resin composition as defined above.

[0012c]

In another aspect, there is provided a cured film as defined above having an optical density of 0.3 or more and 3.0 or less.

[0012d]

In another aspect, there is provided an element having a cured film as defined above.

[0012e]

In another aspect, there is provided an organic EL display device comprising a cured film as defined above as at least one selected from the group consisting of the planarization layers on the drive circuit and the insulation layers on the first electrode.

[0012f]

In another aspect, there is provided a production method for a cured film comprising a step for spreading a negative type colored photosensitive resin composition as defined above over a substrate to form a photosensitive resin film, a step for drying the photosensitive resin film, a step for exposing the dried photosensitive resin film to light, a step for developing the light-exposed photosensitive resin film, and a step for heat-treating the developed photosensitive resin film.

ADVANTAGEOUS EFFECT

[0013]

The negative type colored photosensitive resin composition according to the present disclosure is high in heat resistance and able to serve for producing a cured film having a forward tapered shape.

Brief Description of the Drawings

[0014]

[Fig. 1] Fig. 1 illustrates a cross section of a typical boundary portion of an insulating layer.

[Fig. 2] Fig. 2 illustrates a cross section of a typical TFT substrate having a planarization layer and an insulation layer according to an embodiment.

[Fig. 3] Fig. 3(a) to (d) are schematic diagrams of a substrate of an organic EL display device according to an embodiment.

Description of Preferred Embodiments

[0015]

An embodiment of the present invention is described in detail below.

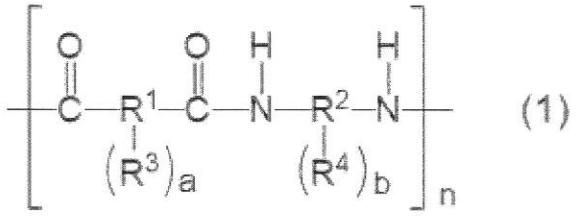
[0016]

The negative type colored photosensitive resin composition according to the present invention includes an alkali-soluble resin (A), a photo initiator (B), a photo polymerizable compound (C), and a coloring agent (D), the alkali-soluble resin (A) containing a polyimide precursor, polybenzoxazole precursor, and/or a copolymer

CLAIMS

[Claim 1]

A negative type colored photosensitive resin composition comprising an alkali-soluble resin (A), a photo initiator (B), a photo polymerizable compound (C), and a coloring agent (D), the alkali-soluble resin (A) containing a polyimide precursor, polybenzoxazole precursor, and/or a copolymer thereof (A-1), each resin (A-1) having a trifluoromethyl group in the backbone chain, wherein the coloring agent (D) contains a benzofuranone based black pigment and/or a perylene based black pigment, wherein the resin (A-1) contains a structure as represented by the undermentioned general formula (1) as primary component:

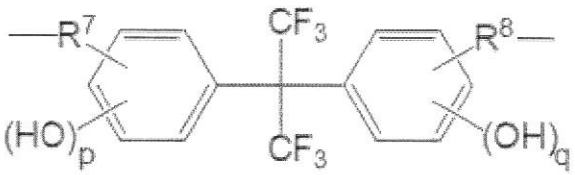


(1)

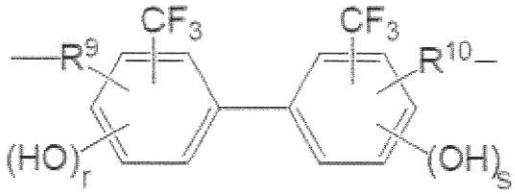
wherein R^1 and R^2 in general formula (1) independently denote a divalent to octavalent organic groups; R^3 and R^4 each denote a phenolic hydroxyl group, sulfonic acid group, thiol group, or $COOR^5$, which may be contained singly or different ones of which coexist; R^5 denotes a hydrogen atom or a monovalent hydrocarbon group having 1 to 20 carbon atoms; a and b each denote an integer of 0 to 6, where $a+b > 0$; n denotes the range of 5 to 10,000; and at least one of the groups represented by R^1-$(R^3)_a$ and those by R^2-$(R4)_b$ contains a trifluoromethyl group.

[Claim 2]

A negative type colored photosensitive resin composition as set forth in claim 1, wherein at least one selected from the group consisting of the groups represented by general formula (2) and those represented by general formula (3) accounts for 20 mol% to 100 mol% of the total quantity, or 100 mol%, of the diamine residues containing a group represented by R^2-$(R^4)_b$ in general formula (1):



(2)

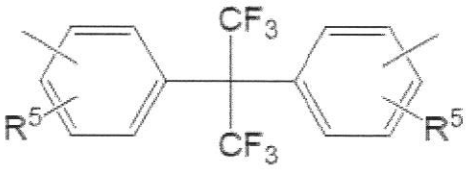


(3)

wherein R^7 to R^{10} in general formulae (2) and (3) each denote a single bond or a divalent organic group containing 1 to 20 carbon atoms; and p, q, r, and s each denote 0 or 1.

[Claim 3]

A negative type colored photosensitive resin composition as set forth in either claim 1 or 2, wherein groups as represented by general formula (4) account for 20 mol% to 100 mol% of the total quantity, or 100 mol%, of the residues of acid components containing a group represented by R^1-$(R^3)_a$ in general formula (1):



(4)

wherein R^5 in general formula (4) denotes a hydrogen atom or $COOR^6$, R^6 denoting a hydrogen atom or a monovalent hydrocarbon group having 1 to 20 carbon atoms.

[Claim 3]

A negative type colored photosensitive resin composition as set forth in any one of claims 1 to 3 further comprising a dispersing agent (E), the dispersing agent containing a tertiary amino group or a nitrogen-containing heterocyclic basic functional group.

[Claim 5]

A negative type colored photosensitive resin composition as set forth in any one of claims 1 to 4 further comprising a chain transfer agent (F).

[Claim 6]

A negative type colored photosensitive resin composition as set forth in any one of claims 1 to 5, wherein the resin (A-1) further contains an alkylene oxide group in the backbone chain.

[Claim 7]

A negative type colored photosensitive resin composition as set forth in any one of claims 1 to 6, wherein the alkali-soluble resin (A) further contains a radically polymerizable monomer-based polymer, siloxane resin, and/or cardo resin.

[Claim 8]

A cured film produced from a negative type colored photosensitive resin composition as set forth in any one of claims 1 to 7.

[Claim 9]

A cured film as set forth in claim 8 having an optical density of 0.3 or more and 3.0 or less.

[Claim 10]

An element having a cured film as set forth in either claim 8 or 9.

[Claim 11]

An organic EL display device comprising a cured film as set forth in either claims 8 or 9 as at least one selected from the group consisting of the planarization layers on the drive circuit and the insulation layers on the first electrode.

[Claim 12]

A production method for a cured film comprising a step for spreading a negative type colored photosensitive resin composition as set forth in any one of claims 1 to 7 over a substrate to form a photosensitive resin film, a step for drying the photosensitive resin film, a step for exposing the dried photosensitive resin film to light, a step for

developing the light-exposed photosensitive resin film, and a step for heat-treating the developed photosensitive resin film.

[Claim 13]

A production method for an organic EL display device comprising a step for forming a cured film by a method as set forth in claim 12, the cured film designed to serve as at least one selected from the group consisting of the planarization layers on the drive circuit and the insulation layers on the first electrode.