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Patent Document 5: Japanese Unexamined Patent Publication (Kokai) No. 2006-312717
Patent Document 6: Japanese Unexamined Patent Publication (Kokai) No. 2001-81404
Patent Document 7: Japanese Unexamined Patent Publication (Kokai) No. 2007-246877
Patent Document 8: International Publication WO 2011/040248
Patent Document 9: Japanese Unexamined Patent Publication (Kokai) No. 2009-179678
Patent Document 10: Japanese Unexamined Patent Publication (Kokai) No. 2014-84360

Summary ~~of the Invention~~

Problems to Be Solved ~~by the Invention~~

[0007]

Of the conventional materials simultaneously exhibiting high refractive index and high transparency, non-photosensitive materials require patterning by etching method, and accordingly, complicated production process was necessary and the production also suffered from the problem of wiring deterioration by chemical solution or plasma in the etching. In the case of photosensitive materials, sensitivity in the exposure and resolution could not be maintained at a high level in the long time storage at room temperature, and the productivity was also insufficient. In the case of positive photosensitive materials, there has been the problem of transparency, and addition of a post-exposure process after the development has been necessary for improving the transparency.

[0008]

An object the of ~~present invention~~embodiments disclosed herein is to develop a negative photosensitive resin composition that exhibits high refractive index, high transparency properties with no additional post-exposure process, high sensitivity in the exposure, and high resolution and solvent resistance after the pattern formation, and which is capable of providing a pattern having a rectangular cross section adapted for pixel formation and

partition formation.

Means for Solving the Problems

[0009]

In order to solve the problems as described above, the present ~~invention~~ disclosure, in a first aspect, has the constitution as described below, namely, a negative photosensitive resin composition comprising the following (a) to (d):

(a) metallic compound particles,

(b) a polysiloxane compound,

(c) a compound having at least 1 group containing an α,β-unsaturated carboxylate ester structure, and

(d) a photopolymerization initiator, the composition further comprising

(e) a compound containing maleimide group.

[0009a] In another aspect, there is provided a cured film prepared by curing the negative photosensitive resin composition as defined above.

[0009b] In another aspect, there is provided a method for producing a cured film comprising the steps of coating the negative photosensitive resin composition as defined above on a substrate, developing the coating after exposure, and curing the coating by heat.

[0009c] In another aspect, there is provided an LED luminaire having the cured film as defined above.

[0009d] In another aspect, there is provided an image sensor having the cured film as defined above.

[0009e] In another aspect, there is provided a backside illuminated CMOS image sensor comprising at least a photoelectric conversion layer, a color filter, and a flattening layer in this order, wherein the color filter has colored pixels divided by the pattern obtained by using the negative photosensitive resin composition as defined above, and wherein refractive index of the flattening layer is smaller than the refractive index the pattern.

Advantageous Effect ~~of the Invention~~

[0010]

The present ~~invention~~ disclosure provides a photosensitive composition which is a negative photosensitive resin composition that exhibits a high index of refraction, high transparency properties with no additional post-exposure process, high sensitivity in the exposure even if stored for prolonged period at room temperature, and high resolution and solvent resistance after the pattern formation, and that provides a pattern having a rectangular cross section adapted for the pixel formation and partition formation. In addition, the present ~~invention~~disclosure does not require the patterning by etching method, and production by a simple procedure is thereby enabled, and deterioration of the wiring by chemical solution or plasma in the etching is also avoided.

Description of Preferred Embodiments

[0011]

The negative photosensitive resin composition of the present invention is a negative photosensitive composition comprising the following (a) to (d):

(a) metallic compound particles,