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METHOD FOR THE MANUFACTURE OF A COLOR FILTER

The present invention relates to a method for the manufacture of an optical color filter which is used for color television cameras etc. and is generally called a stripe filter.

In more detail, the invention relates to a method for the formation of a high-quality stripe filter by a relatively simple procedure and mass production is possible without the necessity for high-level and troublesome techniques.

The stripe filter has a structure wherein, on the surface of optically transparent substrates such as glass, minute band stripes with two or not less than three kinds of different color tones are provided in parallel or intersecting each other.

The width of these stripes may be several μm the colour tones are arranged neatly in a pre-determined order. For this reason, in spite of various proposals having been made hitherto for manufacturing a stripe filter, no method of forming an inexpensive and high-quality stripe filter which is simple in practice and allows for mass production has yet been realized.

For example, by the use of the screen printing method, it is possible to form a stripe filter which is low in price. But, it is impossible to make the film thin and there is a problem regarding the uniformity of film, too. Further, because of the limitation of size of pattern achieved by means of screen printing, the formation of minute patterns i.e. as fine as several μm , is difficult.

With the interference method by multilayer film wherein metal oxide is evaporated in multilayer, the film becomes thick and the manufacturing price is high. Therefore, this is impractical.

Moreover, in a method comprising partial dyeing of a transparent film coating on a substrate to form stripe filter which is then dried and the operation is repeated or partial dyeing of film dyed whole surface with a coloring agent having a fixed spectral characteristic is repeated, the repeating of the formation and the removal of resist dyeing layer or decolorization-preventing layer is necessary resulting in a complicated manufacture of stripe filter. Furthermore, the staining from the sides of band stripes having already been dyed cannot be avoided and the control of dyeing conditions such as selection of dye etc. and the maintenance of accuracy of product are difficult. With the method for the manufacture accompanying the decoloring treatment, in addition, there has also been a problem that the spectral characteristic

of minute band stripes with respective color tones changes with the lapse of time because of the remaining of decoloring agent and decomposed products of dye.

GB 2081462 describes the manufacture of multicoloured optical filters wherein a coloured liquid composition comprising a colouring agent, a coating material and a photosensitive hardener is applied to a transparent base plate. The resulting film is dried and predetermined areas are exposed to electromagnetic radiation through a mask to harden the areas exposed. The unexposed areas of the film are dissolved and the procedure is repeated for other differently coloured liquid compositions to produce a multi-coloured filter. In this method the coating is applied directly to a substrate for the colour filter which results in difficulty is controlling colour density and reproducibility is relatively poor.

The purpose of the invention is to remove the shortcomings of conventional methods as above.

According to the invention there is provided a method for the manufacture of a color filter by forming a pattern composed of a plurality of minute areas different in color tones on the surface of a transparent substrate, which comprises (1) a process wherein a layer, comprising a photoresist material and containing one coloring agent and which was coated on a support and dried, is transferred to the surface of the transparent substrate and the colored photoresist layer is exposed to light through a mask with a fixed

pattern and is treated with a solvent which has different solubilities between the exposed area and the unexposed area to form the pattern, and, for the colored photoresist layers with other tones, the procedure of the order aforementioned is conducted and repeated fixed times; or (2) a process wherein a layer comprising a photoresist material and containing a coloring agent of one color tone is coated on a support and dried, wherein the colored photoresist layer is exposed to light through a fixed pattern mask and the pattern is formed on the support through the development and wherein said pattern is transferred to the surface of transparent substrate, and, for the photoresist layers which contains coloring agents of other color tones, the procedure of the order aforementioned is conducted and repeated fixed times.

In the invention, known photoresist materials, coloring agents, etc. can be utilized effectively and, through the selection of the photoresist material, the formation of minute patterns as fine as several μm is possible. Moreover, since dyeing is unnecessary, the film can be made thin. Furthermore, the coloring agent used for the formation of color images can also be selected from pigments, dyes, etc., in a wide range. Therefore, the most suitable coloring agent can be selected combining fastness, color tone, etc.

In the case of a stripe filter used for color television camera, the band stripes with a thickness of about 1 to 2 μm and a width of about 10 to 30 μm in red, green and blue colors (the primary colors of light) are arranged in parallel putting the three colors alternately. However, the invention can, of course, be applied to stripe filters other than this, for example, one wherein the order of arrangement differs from this or one wherein number of colors is two or not less than four. Moreover, the invention is applicable to one wherein colors consist of a plurality of colors for subtractive mixing and the band stripes with these color tones are formed crossing each other, or to color filters having patterns other than stripes.

In following, the invention will be explained
in more detail.

The photoresist material employed in the invention is a photo-
sensitive material wherein changes such as polymerization,
5 crosslinking, dimerization, decrosslinking, decomposition,
rearrangement, etc. are caused through the irradiation
of light and, based thereon, changes occur such that
the solubility to the solvent is increased or decreased
and the like, and indicates one in the class which is
10 also called a photosensitive material for plate-making,
or a photo-sensitive resin.

The photoresist material may be of the negative type or of positive type. Although negative type photoresist materials may be used in the first part of the invention, both types of photoresist materials can be used in the second part of the invention. This is a significant feature of the latter.

As examples of photoresist materials within the context of this invention, the following are known, but the invention is not confined to these examples. Examples of negative type photoresist materials:

- (1) Compositions consisting of photosensitive ferric salts such as ammonium ferric citrate, ammonium ferric tartrate, ammonium ferric oxalate and sodium ferric oxalate which give ferrous ions through the irradiation of light and hydrophilic polymers such as gelatin, modified gelatin, polyvinyl alcohol, partially saponified polyvinyl acetate, polyacrylic acid and copolymer therewith and polyacrylamide and homologs thereof.
- (2) Compositions consisting of hydrophilic polymers such as gelatin, fish glue, arabic gum, polyvinyl alcohol, polyacryl-amide, carboxymethylcellulose, copolymer of vinyl methyl ether with maleic anhydride, etc. and tetrazonium salt of diamino compounds such as benzidine and dianidine or diazo resin condensed p-diazodiphenylamine with paraformaldehyde.
- (3) Diazo resins condensed diazo compounds such as p-diazodiphenylamine with paraformaldehyde.

- (4) Compositions consisting of azide compounds such as sodium 4, 4'-diazidestilbene-2, 2'-disulfonate and sodium 4-azide-benzalacetone-2-sulfonate and polymers such as polyacrylamide, polyvinylpyrrolidone, gelatin, casein, partially saponified poly-
5 vinyl acetate grafted with acrylonitrile, N-alkoxymethylated nylon, etc.
- (5) Compositions consisting of azide compounds such as 4,4'-azide benzalacetone, 4,4'-diazidebenzal, methylcyclohexanone, etc. and polymers such as cyclized rubber, synthetic rubber, etc.
- 10 (6) Compositions consisting of cinnamic ester of polyvinyl alcohol or allylacrylic ester and sensitizers such as 5-nitroacenaphthene, 1,2-benzanthraquinone, etc.
- (7) Compositions consisting of polymers of vinyl monomers having photosensitive groups, for example, cinnamic p-vinylphenyl ester
15 or copolymers thereof with other monomers and sensitizers such as 5-nitroacenaphthene.
- (8) Compositions consisting of vinyl monomers such as acrylamide, methylenebisacrylamide, acrylic acid, acrylic ester, triethylene-glycol diacrylate, polyethyleneglycol dimethacrylate, trimethylol-
20 propane trimethacrylate, and pentaerythritol tetramethacrylate, cellulose derivatives or polyvinyl alcohol derivatives and photopolymerization initiators.
- (9) Compositions consisting of acrylamides such as methylenebis-acrylamide and N,N'-hexamethylenebismethacrylamide, alcohol-
25 soluble nylon and photopolymerization initiators.

(10) Compositions consisting of ethylenically unsaturated compounds such as acrylamide, acrylic acid and N,N'-methyleneacryl-amide, photosensitive ferric salts such as ammonium ferric citrate, ammonium ferric tartrate, ammonium ferric oxalate and sodium ferric oxalate, and hydrophilic polymers such as gelatin, modified gelatin, polyvinyl alcohol, partially saponified polyvinyl acetate, polyacrylamide and copolymer therewith and polyacrylamide and homolog thereof.

(11) Compositions consisting of ethylenically unsaturated monomers such as acrylamide and acrylic acid, photo-reducible colors such as thionine, riboflavin and methylene blue, reducing agents such as triethanolamine ascorbate, thiourea, sodium ethylenediamine-tetraacetate, etc., hydrophilic polymers such as gelatin, polyvinyl alcohol, polyacrylamide, etc., and, if necessary, crosslinking agents such as calcium acrylate, barium acrylate, N,N'-methylenebis-acrylamide, etc.

Examples of positive type photoresist materials:

(1) Quinonediazide compounds such as ester of O-naphthoquinone-diazidesulfonic acid, sulfonamide, etc. or mixtures of these quinonediazide compounds with alkali-soluble resins such as Novolak phenol resin.

(2) Reaction products of polynuclear anions of heteropolyacid or isopolyacid with diazonium salts.

(3) Compounds having O-nitrobenzaldehyde group such as bis-(3-aldehyde-4-nitrophenyl)-phthalate and 3-aldehyde-4-nitro-phenylcarbonate.

(4) Ethylenedioxy-5,5'-resorcinol.

The photosensitive layer comprising a photoresist material as described above is coated on the support and dried by conventional methods after the coloring agents such as pigments, dyes, etc. were incorporated into the solution or dispersion of the photoresist material or, after the solution of the photoresist material alone was coated and dried, resin solution incorporated the coloring agent is coated on the photosensitive layer and dried. Further, the photosensitive layer can also be made by coating and drying resin solutions incorporating the coloring agent and by coating the solution of photopolymer thereon.

As the coloring agents used for the formation of the color image of the photoresist material, pigments and dyes are used. The pigments may be inorganic pigments, organic pigments, etc used in the form of an aqueous dispersion or solvent dispersion, respectively. As the dyes, various oil-soluble dyes, water-soluble dyes, spirit dyes, disperse dyes, etc. can be used.

In the invention, since conventional pigments and dyes can be used depending on the kind of photoresist material to be used, the constitution of the photosensitive layer or the like, the range of selection of coloring agent becomes wide. This is a significant feature of the invention and the most suitable coloring agent can be selected combining fastness and color tone, etc.

Upon the selection of coloring agent, however, it is necessary to select the coloring agent which has compatibility with the photopolymer and the color tone aimed, that is, the color tone corresponding to the three primary colors of light or the subtractive mixing and which has also high purity, high transparency, excellent light fastness, etc., of course.

Moreover, the formation of image through exposure and development, can follow conventional methods depending on the photopolymer or the constitution of the photosensitive layer. As the supports, polyvinyl chloride, polyethylene, polypropylene, polystyrene, polyamide, polycarbonate, acetylcellulose, polyester, polyethylene terephthalate, etc. can be mentioned. These are selected taking the adherence to photosensitive layer, the dimensional stability or the like into consideration.

Next, for the purpose of enhancement of transferability, adherence or the like of the colored photopolymer to the substrate to form stripe filter, preliminary undercoat layers such as release layer etc. are provided more effectively on the support of the colored photopolymer. Also, a thin-film pressure-sensitive or thermosensitive layer can be provided on the colored photopolymer layer. Moreover, if a pressure-sensitive or thermosensitive adhesive layer is provided on the substrate to form a stripe filter, firmer

adhesion can be obtained. Such release layer or adhesive layer should be selected taking the kind of support used, the kind of photopolymer, the kind of developing solution, etc. into consideration.

5 Similarly, also when the pattern formed on the support is transferred to the transparent substrate as in the second part of the invention, preliminary provision of undercoat layers such as release layer, peel layer, etc. on the support is more effective for the
10 improvement in the transferability. Further, in order to enhance the adherence of the pattern after it is transferred to the transparent substrate, a pressure-sensitive or thermosensitive adhesive layer which has excellent adherence to the photosensitive layer and is
15 readily strippable off from the support may be provided on the support. Similarly, the provision of a pressure-sensitive or thermosensitive adhesive layer on the transparent substrate is more effective.

 As the release agents used for this purpose,
20 polymers, prepolymer and the like with release function, which have been used hitherto for release paper, for example, one or a mixture of not less than two of silicon-based resin, alkyd-based resin, urethane-based resin, polyester-based resin, amino-based resin and
25 phenolic resin can be used. Moreover, the functional groups may be introduced in a side chain or at an end so that these polymers

or prepolymers are crosslinked or polymerized through light or radial rays.

As the thermosensitive adhesive agents which are excellent in the adherence with photosensitive layer and strippable off easily from the support, ethylene-vinyl acetate copolymer, vinyl chloride-vinyl propionate copolymer, polyolefinic resin, vinyl chloride-based polymer, ethylene-carboxylic acid ester copolymer, water-soluble polyvinylacetal resin, butyral resin, formal resin, vinylidene chloride-based resin, chlorinated polyolefin, chlorinated ethylene-vinyl acetate copolymer, acrylic resin, rubber-based resin, etc. can be mentioned. These are selected depending on the photosensitive layer used and the kind of support.

Besides, as the adhesive agents applied to the transparent substrate pressure-sensitive or thermosensitive adhesive agents generally known are used and these are not confined particularly.

As the method to transfer the photoresist layer to glass substrate according to the first part of the invention, a known laminator can be used, and the pressure adhesion, heat-fusing adhesion or the like is utilizable depending on the kind of adhesive agent or photoresist layer aforementioned.

When the pattern formed on the support is transferred to the transparent substrate according to the second part of

the invention, the film thickness of the stripe filter formed can be made this preferable, if transferred pattern alone. However, the pattern can also be transferred together with the adhesive layer aforementioned which has excellent
5 adherence to the photosensitive layer and is strippable off easily from the support. In this case, it goes without saying that the thickness of the adhesive layer is as thin as possible. For the transfer, laminator is used ordinarily and the pressure sensitive adhesion method or thermo-
10 sensitive adhesion method is selected properly depending on the kind of photosensitive layer or adhesive layer used as in the first part of the invention.

As described above, in accordance with the invention, photopolymers, coloring agents, release agents, adhesives,
15 etc., all of which have been known hitherto, can be utilized effectively, and, by means of transfer techniques publicly know, high-quality stripe filter for which the procedure is relatively simple can be manufactured, Accordingly, the shortcomings of various methods known up
20 to this time can be overcome.

Namely, by the use of photopolymer, the formation of the minute pattern as fine as several μm is possible, and, since dyeing etc. are unnecessary, the film can also be made thin.

25 Further, according to the invention strict control and the greatest care in the selection and the management

of dyeing conditions are not required, but also the greater problem that, at the time of second and subsequent dyeing, the dye used migrates to the zone having already been dyed previously to stain or to mix and exerts bad influence on the spectral characteristic of the zone thereof is removed. Moreover, in conventional methods conducting partial decolorization, a similar problem has arisen through the remaining of decoloring agent consisting of oxidizing agent, reducing agent or the like, but this problem can also be solved by the invention. As described, in accordance with the invention, stable high-quality stripe filter can be manufactured easily without the necessity of high-level and troublesome techniques.

Besides, by selecting the pattern when exposing the colored photopolymer layer, the color filters having various desired patterns such as mosaic etc., as well as stripe can be made.

The following examples further illustrate the invention. Besides, "parts" appearing below mean "parts by weight" in all cases.

Example 1

To an aqueous solution of photopolymer (5% solids) consisting of 10 parts of gelatin (S-778, made by Nippi Co.) and 1 part of potassium dichromate were added dyes having different color tones, respectively, to prepare three kinds of colored compositions.

Red dye in colored composition R:

Suminol Milling Red RS (made by Sumitomo Chemical)

Green dye in colored composition G:

10 Equiquantity mixture of Acid Fast Yellow MR (made by Chugai Chemicals) with Sumitomo Brilliant Blue 5G (made by Sumitomo Chemical)

Blue dye in colored composition B:

Supranol Cyanine 6B (made by Bayer)

15 Respective dyes were added so as the spectral absorbances of band stripes with a thickness of about $1\text{ }\mu\text{m}$ to become more than 1.5 at respective wavelengths where the absorbance becomes maximum, when made up the stripe filter.

Three kinds of colored compositions thus prepared were coated
20 on the biaxially stretched polyethylene terephthalate film of $75\text{ }\mu\text{m}$, respectively, so as the thickness after drying to become about $1\text{ }\mu\text{m}$ and dried.

Following this, polyolefinic thermosensitive adhesive agent AC 1000 (made by Mitsubishi Yuka Fine) was coated on one face of
25 transparent glass plate with a thickness of 2 mm so as the thickness

after drying to become $2\ \mu\text{m}$ and dried.

After the preparatory processes as these, the face of adhesive layer on transparent glass plate was superposed on the R face of colored composition of film having been coated with colored composition R to adhere with hot roll of 100°C . When stripped off the film, R layer of colored composition was transferred to the glass substrate. Then, placing a mask having light-transmissive areas with a width of $100\ \mu\text{m}$ at intervals of $200\ \mu\text{m}$, ultraviolet rays were irradiated onto the R layer of colored composition on glass substrate to cure the colored composition R at the portions corresponding to light-transmissive areas, and the unexposed areas were dissolved and removed with warm water to form red band stripes.

The film having been coated with colored composition G was superposed on this and the colored composition G was transferred similarly to the red band stripes on glass substrate. Then, moving the position of the mask aforementioned by a frame, ultraviolet rays were irradiated, and the unexposed areas were removed similarly to form an image with red band stripes and green band stripes arranged alternately.

Further, using the film having been coated with colored composition B, the procedure aforementioned was repeated and the stripe filter with red, green and blue band stripes arranged adjacent mutually in the width direction was obtained finally.

Example 2

To an aqueous solution of photopolymer (5% solids) consisting of 10 parts of polyvinyl alcohol (average polymerization degree 1700-2400, saponification degree $98.5 \pm 0.5\%$) and 0.6 parts of sulfonate of condensate of p-diazodiphenylamine with formaldehyde as a curing agent were added following water-dispersed pigments as coloring agents, respectively, to prepare three kinds of colored compositions different in the color tones.

Yellow pigment in colored composition Y:

10 Aquafine AF Yellow E-2 (made by Dainichi Seika Co.)

Magenta pigment in colored composition M:

 Aquafine AF Red E-3 (made by Dainichi Seika Co.)

Cyan pigment in colored composition C:

 Aquafine AF Blue E-1 (made by Dainichi Seika Co.)

15 The addition amount of respective pigments was determined so as the spectral characteristic to become fixed reference as in Example 1.

The procedure was made similar to that in Example 1, except that uncured areas after the irradiation of ultraviolet rays were dissolved and removed with water. Namely, the colored composition Y was transferred to the transparent glass plate having been coated with AC 1000 on one face to a thickness of 2 μm and, after exposed with a fixed mask, this was developed to form yellow band stripes on the glass plate. Then, using colored composition M and colored composition C, the procedure aforementioned was

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repeated in sequence to form the stripe filter having yellow, magenta and cyan colors.

Example 3

To an aqueous solution of photopolymer (5% solids concentration) consisting of 10 parts of gelatin (S-778, made by Nippi Co.) and 0.4 parts of ammonium ferric oxalate were added water-dispersed pigments as coloring agents, respectively, to prepare colored compositions R, G and B different in the color tones.

Red pigment in colored composition R:

- 10 Equiquantity mixture of Aquafine AF Yellow E-2 with Aquafine AF Red E-3.

Green pigment in colored composition G:

Equiquantity mixture of Aquafine AF Yellow E-2 with Aquafine AF Blue E-1.

- 15 Blue pigment in colored composition B:

Equiquantity mixture of Aquafine AF Blue E-1 with Aquafine AF Red E-3

(All pigments are made by Dainichi Seika Co.)

- 20 The procedure was similar to that in Example 1, except that, in the developing treatment after the irradiation of ultraviolet rays, the transferred substrate was immersed into 1% aqueous solution of H_2O_2 for 1 minute at 18°C to insolubilize the exposed areas sufficiently and then immersed into water at 37°C to dissolve and remove the uncured areas.

Example 4

To an aqueous solution of photopolymer (5% solids) consisting of 10 parts of gelatin (S-778, made by Nippi Co.) and 1 part of potassium dichromate were added dyes having different color tones, respectively, to prepare three kinds of colored compositions.

Red dye in colored composition R:

Suminol Milling Red RS (made by Sumitomo Chemical)

Green dye in colored composition G:

Equiquantity mixture of Acid Fast Yellow MR (made by Chugai Chemicals) with Sumitomo Brilliant Blue 5G (made by Sumitomo Chemical)

Blue dye in colored composition B:

Supranol Cyanine 6B (made by Bayer)

Respective dyes were added so as the spectral absorbances of band stripes with a thickness of about $1\ \mu\text{m}$ to become more than 1.5 at respective dominant wavelengths, when made up the stripe filter.

Three kinds of colored compositions thus prepared were coated on the biaxially stretched polyethylene terephthalate film of $75\ \mu\text{m}$, respectively, so as the thickness after drying to become about $1\ \mu\text{m}$ and dried.

Following this, polyolefinic thermosensitive adhesive agent AC 1000 (made by Mitsubishi Yuka Fine) was coated on one face of transparent glass plate with a thickness of 2 mm so as the

thickness after drying to become 2 μm and dried.

After the preparatory processes as these, placing a mask having light-transmissive areas with a width of 100 μm at intervals of 200 μm , ultraviolet rays were irradiated onto three colored compositions, respectively, to cure the areas corresponding to these light-transmissive areas, and the unexposed areas were dissolved and removed with warm water to obtain the films formed red, green and blue band stripes, respectively.

Next, the film with red band stripes was contacted closely with the face of adhesive layer on the transparent glass plate aforementioned and passed through two-roll laminator heated to 100°C to adhere. Then, the supporting film was stripped off and the red band stripes were formed on the glass plate. Following this, the film with green band stripes was superposed thereon moving the position of band stripes by a frame and laminated similarly. When stripped the supporting film off, an image with red and green band stripes arranged alternately was obtained. Further, the transferring procedure aforementioned was repeated using the film with blue band stripes to obtain stripe filter with red, green and blue band stripes arranged adjacent mutually in the width direction finally.

Example 5

On polypropylene film of 100 μm , three kinds of colored layers consisting of three kinds of dyes having different color tones and formal resin (Denka Vinylek #30, made by Denki Kagaku Co.)

were coated, respectively, so as the thickness after drying to become $1\text{ }\mu\text{m}$ and dried. Dyes used were red, green and blue dyes shown in Example 4 and the amount of dyes added was also determined according to Example 4 similarly.

5 Following this, the photopolymer consisting of alkali-soluble phenol Novolak resin and condensate of 1,2-naphthoquinonediazide(2)-5-sulfonyl chloride with alkali-soluble Novolak resin in weight ratio of 2 : 1 was coated on respective colored layers so as the thickness after drying to become $0.5\text{ }\mu\text{m}$ and dried to
10 obtain three kinds of photosensitive films in red, green and blue colors.

Then, on one face of the transparent glass plate with a thickness of 2 mm, polyester-based adhesive agent (Bostic 7040, made by Bostic Japan Co.) was coated so as the thickness after drying
15 to become $2\text{ }\mu\text{m}$ and dried.

After the preparatory processes as these, the formation of band stripes and the transfer to the transparent glass plate were made according to Example 4, except that an aqueous alkaline solution containing 0.4% of sodium hydroxide and 30% of sodium
20 salicylate was used for the development of photosensitive films, to form the stripe filter having red, green and blue colors.



CLAIMS

1. A method for the manufacture of a color filter by forming a pattern composed of a plurality of minute areas different in color tones on the surface of a transparent substrate, which comprises (1) a process wherein a layer, comprising a photoresist material and containing one coloring agent and which was coated on a support and dried, is transferred to the surface of the transparent substrate and the colored photoresist layer is exposed to light through a mask with a fixed pattern and is treated with a solvent which has different solubilities between the exposed area and the unexposed area to form the pattern, and, for the colored photoresist layers with other tones, the procedure of the order aforementioned is conducted and repeated fixed times; or (2) a process wherein a layer comprising a photoresist material and containing a coloring agent of one color tone is coated on a support and dried, wherein the colored photoresist layer is exposed to light through a fixed pattern mask and the pattern is formed on the support through the development and wherein said pattern is transferred to the surface of transparent substrate, and, for the photoresist layers which contains coloring agents of other color tones, the procedure of the order aforementioned is conducted and repeated fixed times.



2. A method for the manufacture of a color filter according to claim 1, wherein the colored photoresist layers consist of three color tones corresponding to three primary colors of light.

5 3. A method for the manufacture of a color filter according to claim 1, wherein the colored photoresist layers consist of a plurality of primary colors for subtractive mixing.

10 4. A method for the manufacture of a color filter according to any of claims 1 to 3, wherein the photoresist material of negative type is selected from a group of (1) compositions comprising photosensitive ferric salts and the hydrophilic polymers; (2) hydrophilic polymers and tatrazonium salts of diamino
15 compounds or diazo resins; (3) diazo resins; (4) azide compounds and polymers; (5) cinnamic esters of polyvinyl alcohol or allylacrylic ester and sensitizers; (6) polymers or copolymers or vinyl monomers with photosensitive group and sensitizers; (7) vinyl monomers,
20 cellulose-or polyvinyl alcohol derivatives and photopolymerization initiators; (8) acrylamides, alcohol-soluble nylon and photopolymerization initiators; (9) ethylenically unsaturated compounds, photosensitive ferric salts and hydrophilic polymers; and (10)
25 ethylenically unsaturated monomers, photo-reducible colors, reducing agents, hydrophilic polymers and, if necessary, crosslinking agents.



5. A method for the manufacture of a color filter according to any of claims 1 to 3, wherein the photoresist material of positive type is selected from a group of compositions comprising quinonediazide compounds or mixtures of these
5 with alkali-soluble resins, reaction products or polynuclear anions of heteropolyacid or isopolyacid with diazonium salts, compounds having O-nitrobenzaldehyde group, and ethylenedioxy-5, 5'-resorcinol.
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