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3,047,385 PRODUCTION OF COLOR PHOTOGRAPHIC IMAGES

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No Drawing. Filed Nov. 29, 1960, Ser. No. 72,298
Claims priority, application Great Britain Nov. 30, 1959
6 Claims. (Cl. 96—9)

The present invention relates to the production of color photographic images, more particularly to a process of color correction utilizing an integral masking procedure.

It is known that dyes formed by color development in subtractive multicolor photographic pictures do not transmit all of the light which practical considerations demand. The cyan dye which should absorb red light and transmit green and blue light usually absorbs a small amount of green and blue light, as well as a major proportion of red light. The magenta dye which should absorb green light and transmit blue and red light usually absorbs a considerable amount of blue light and a small amount of red light, as well as a major proportion of green light. The yellow dye which should absorb blue light and transmit green and red light is usually satisfactory.

Due to the above mentioned unwanted side-absorptions of the dyes formed by color development, it is practically impossible to obtain a true reproduction of the original colors on printing multicolor photographic transparencies containing such dyes.

Correction of the colors on printing is therefore desirable, and this is usually done by masking. Since separate masks are difficult to register with the color transparency, it is desirable that the mask be integral with the color images.

A process for the production of a color photographic image wherein the mask is integral with the color image is described in our U.S. patent application Serial No. 705,508, filed December 27, 1957, in U.S. patent application Serial No. 66,964, filed November 3, 1960, by Raphael Karel Van Poucke, Arthur Henri De Cat and Marcel Hendrik Verbrugghe for "Process for the Manufacture of Color Photographic Images and Color Correction," in our U.S. patent application Serial No. 70,914 filed November 22, 1960, for "Production of Color Photographic Images," and in U.S. patent application Serial No. 77,117, filed November 14, 1960, by Jozef Frans Willems and Jan Jaeken for "Production of Color Photographic Images."

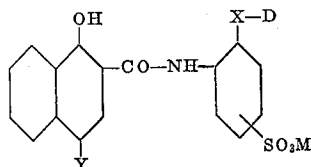
According to said first three pending applications, a color-corrected image is formed in a photographic element, comprising a silver halide emulsion layer and a color coupler (more particularly a color coupler of the naphthol type) which is reactive with the oxidation product of an aromatic amino developing agent to form by color development a primary dye image (more particularly a cyan dye-image) which absorbs a major proportion of light in one region of the visible spectrum (more particularly the red light) and undesirably absorbs a minor proportion of light in at least one other region of the visible spectrum (more particularly the green light), by treating the exposed and color-developed photographic element with an oxidizing solution (more particularly a photographic bleaching bath), in the presence of a 4-amino-pyrazolone-3-compound, which after oxidation couples with the residual color coupler, whereby a secondary dye image (more particularly a magenta dye image) having a gradation opposite to that of said primary dye image, and absorbing light in at least one of said unwanted minor absorption regions (more particularly the green light) but transmitting substantially all the light in said major absorption region (more particularly the red light) is formed.

It is an object of the present invention to provide an improved method for correcting the colors of a photographic image used for printing. A further object is to provide a new method for the preparation of an integral mask in color film, more particularly to provide a yellow to orange colored image compensating the unwanted absorption of blue light by the cyan image dye. Other objects will appear from the following description and examples.

These objects are accomplished by treating an image-wise exposed photographic element comprising a silver halide emulsion layer and a color coupler of the naphthol type which is reactive with the oxidation product of an aromatic amino developing agent to form by color development a cyan dye image. The image-wise exposed and color-developed photographic silver halide emulsion layer comprises also an aromatic monocyclic hydroxy compound containing a sterically hindering substituent in both ortho-positions, and being substituted in the position of the hydroxy-group either or not with a substituent which splits off by the oxidative coupling of the aromatic monocyclic hydroxy compound with the residual color coupler of the naphthol type during the treatment in an oxidizing solution, e.g. a photographic bleaching bath.

It has been found indeed that by oxidative coupling of the mask-forming compounds of the present invention with color couplers for cyan of the naphthol class a yellow to orange color mask image is obtained which compensates the undesirable side-absorption in the blue part of the spectrum of the cyan image obtained by color development of the exposed areas of the layer containing said cyan coupler.

According to a preferred embodiment of the present invention, a photographic material is used containing color couplers of the following general formula:



wherein:

X represents a member selected from the group consisting of an oxygen atom, a sulfur atom, a —NH—CO— group, a —CO—NH— group, a —SO₂—NH— group, a —NH—SO₂— group, a —N—alkyl group and a sulfonyl group;

Y represents a member selected from the group consisting of an hydrogen atom and a halogen atom;

D represents an aliphatic radical comprising a linear chain of at least 5 and at most 20 carbon atoms, preferably 14, 16, or 18 carbon atoms;

M represents a member selected from the group consisting of an hydrogen atom, an alkali metal atom and an ammonium group.

Suitable compounds which give good results and which correspond to the above general Formula I are:

N - (2' - cetyloxy - 5' - sulfo) - phenyl - 1 - hydroxy - 2-naphtholic acid amide sodium salt,

N - (2' - cetyloxy - 5' - sulfo) - phenyl - 1 - hydroxy - 4-chloro-2-naphthoic acid amide sodium salt,

N - (2' - cetylmercapto - 5' - sulfo) - phenyl - 1 - hydroxy-2-naphthoic acid amide sodium salt,

N - (2' - cetylmercapto - 5' - sulfo) - phenyl - 1 - hydroxy-4-bromo-2-naphthoic acid amide sodium salt,

N - (2' - cetylmercapto - 5' - sulfo) - phenyl - 1 - hydroxy-4-chloro-2-naphthoic acid amide sodium salt,

N - (2' - palmitoylamino - 4' - sulfo) - phenyl - 1 - hydroxy-2-naphthoic acid amide sodium salt,

N - (2' - methyl cetyl amino - 5' - sulfo) - phenyl - 1 - hydroxy-4-chloro-2-naphthoic acid amide sodium salt,
 N - (6' - cetylsulfonylphenyl) - 1 - hydroxy - 2 - naphthoic acid amide-3'-sodium sulfonate,
 N-(6'-cetylsulfonylphenyl)-1-hydroxy-4-chloro - 2 - naphthoic acid amide-3'-sodium sulfonate,
 N-(4'-cetylsulfonyl)-1-hydroxy-2-naphthoic acid amide-3'-sodium sulfonate.

These color couplers for cyan can be prepared e.g. by condensation of 1-hydroxy-2-naphthoic acid or its derivatives with the suitable aromatic amides according to German patent application No. G 30,287, filed August 13, 1960.

Suitable mask forming compounds are e.g. phenols containing a sterically hindering substituent such as a tertiary butyl group, a phenyl group or a cyclohexyl group, in both ortho-positions in respect to the hydroxyl group and which further may contain in the p-position in respect of the hydroxyl group a substituent with labile character during oxidative coupling such as a halogen atom, a sulfonic acid group, a sulfonic acid ester group, a carboxylic acid group or a substituted methylene group.

PREPARATION 1

The preparation of 2,6-di-tert-butyl-4-bromophenol is described by H. Hart, J. Am. Chem. Soc., 73, p. 3181 (1951).

PREPARATION 2

The preparation of bis-(3,5-di-tert-butyl-4-hydroxyphenyl)-methane is described by T. Coffield, J. Am. Chem. Soc., 79, p. 5021 (1957).

PREPARATION 3

The preparation of 2,6-di-tert-butyl-phenol-4-carboxylic acid is described by G. Yoke, J. Org. Chem. 21, p. 1291 (1956).

PREPARATION 4

The preparation of 2,6-di-tert-butyl-4-chlorophenol is described by H. Hart, J. Am. Chem. Soc., 73, p. 1381 (1951).

PREPARATION 5

The preparation of 2,6-di-tert-butylphenol-4-sulfonic acid. 10.3 g. (0.05 mol) of di-tert-butylphenol are slowly added to 20 cm.³ of concentrated sulfuric acid whilst stirring and keeping the temperature at 45° C. The mixture is further stirred for ½ h. at 45-50° C. The reaction mixture is poured into ice-water. After extraction of the residual di-tert-butyl-phenol with ether barium carbonate is added. The barium sulfate precipitate formed is sucked off and the filtrate is evaporated to dryness. The residue contains 10 g. of the barium salt of 2,6-di-tert-butylphenol-4-sulfonic acid. The barium salt dissolved in 50 cm.³ of water can be converted into a sodium salt by adding to this solution a solution of 3.4 g. of sodium sulfate in 20 cm.³ of water. The formed barium sulfate is sucked off and the filtrate is evaporated to dryness.

PREPARATION 6

The preparation of 2,6-dicyclohexylphenol is described by H. Lefebvre, Compt. Rend., 220, 783 (1945).

PREPARATION 7

The preparation of 2,6-diphenyl-4-chlorophenol. 7.8 g. (0.03 mol) of 2,6-diphenyl-4-amino-diphenylphenol prepared according to A. Luttringhaus Ann., 542, 257 (1939), are diazotized in 8.5 cm.³ of concentrated hydrochloric acid, 25 cm.³ of water and 20 cm.³ of dioxane at 0° C. with a concentrated aqueous solution of 2.1 g. (0.03 mol) of sodium nitrite. The solution of the diazonium salt is added at room temperature to 170 cm.³ of concentrated hydrochloric acid containing cuprochloride. (The cuprochloride is prepared from 10.5 g. of copper sulfate, 27.3 g. of sodium chloride, 22.3 g. of sodium metabisulfite and 14.7 g. of sodium hydroxide.) Simultaneously with an evolution of nitrogen a precipitate is

formed which is sucked off. After washing with water 2,6-diphenyl-4-chlorophenol is obtained, which melts with decomposition at 150° C.

The chemical formulae of the compounds according to the above seven preparations are given hereinafter in a separate table in column 7.

According to a preferred embodiment of the present invention, the mask forming compound is incorporated in one of the layers present in the light-sensitive photographic material, preferably in the red sensitive silver halide emulsion layer containing a color coupler for cyan and wherein the mask image is to be formed by oxidative coupling of the residual color coupler for cyan present in that layer with the mask forming substance.

The mask-forming compounds of the present invention may be used together with one of the mask-forming compounds disclosed in our U.S. patent application Serial No. 70,914 filed November 22, 1960, for "Production of Color Photographic Images," which by oxidative coupling with color couplers for cyan of the naphthol class yield magenta to red colored mask images, compensating mainly the undesirable side-absorption in the green part of the spectrum of the cyan image; in this way a cyan image can be obtained, the undesirable side-absorptions of which in the blue as well as in the green part of the spectrum are almost completely compensated.

For carrying out the process according to the present invention, the color couplers and mask compounds can be incorporated into a photographic silver halide emulsion prepared by means of the colloids usually employed therefor, such as for instance gelatin, polyvinyl alcohol, collodion or other natural or synthetic colloids. The silver halide emulsion can be coated on a support consisting of paper, glass, nitrocellulose, cellulose esters such as cellulose triacetate, polyester, polystyrene or another natural or synthetic resin, and forms part of a photographic material with one or more emulsion layers. The multilayer material usually comprises the following elements: a support, a red-sensitive emulsion layer having a color coupler for cyan, a green-sensitive emulsion layer having a color coupler for magenta and a blue-sensitive emulsion layer having a color coupler for yellow. Usually there is a yellow filter composed in most of the cases of a gelatin layer containing dispersed colloid silver, located between the blue-sensitive emulsion layer and the emulsion layer sensitized to green. It is not only possible to incorporate the color couplers into the light-sensitive silver halide emulsion layer itself but they can also be incorporated into an adjacent non-light-sensitive colloid layer or into a non-light-sensitive layer which is separated from the light-sensitive emulsion layer by a water-permeable colloid layer.

The process according to the invention proceeds as follows: silver halide is reduced to silver at the exposed areas in a color developing bath containing a primary amine aromatic developing agent which is at the same time oxidized. The oxidized developing agent reacts with the color coupler and forms a dyestuff, the mask forming compound according to the invention not being affected. After the color development, the material comes into the bleaching bath wherein the oxidation of the mask forming compound takes place. The remaining color coupler still available at the non-exposed areas of the material couples oxidatively with the oxidation product of the compound thus formed whereby the colored mask is formed. Subsequently, the photographic color material is washed with water, fixed and dried.

The following aromatic amino-compounds can be used as developers for such material: mono-, di- and triamino-aryl compounds, more especially N,N-dialkyl-p-phenylenediamines, such as N,N-diethyl-p-phenylenediamine and N,N-diethyl-2-methyl-p-phenylene diamine, and derivatives thereof such as N,N-dialkyl-N'-sulphomethyl- or carboxymethyl-p-phenylenediamine. As useful mono-amino-developers should be cited; aminophenols and

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amino-cresols or their halogen derivatives and also the amino-naphthols.

The bleaching bath generally contains potassium bromide, borax, magnesium sulphate and especially potassium ferricyanide. These elements are dissolved in precisely determined amounts of water so that a solution with a determined pH value is obtained.

The following examples illustrate the invention without limiting, however, the scope thereof.

Example 1

To ½ kg. of red-sensitive bromoiodide emulsion (2% iodide) containing ¼ mol of silver halide are added 10 g. of N-(6'-cetylsulfonylphenyl)-1-hydroxy-2-naphthoic acid amide-3'-sodium sulfonate dissolved in 193 cm.³ of water and 7 cm.³ of aqueous sodium hydroxide 2 N and 10 g. of 2,6-di-tert-4-chlorobutylphenol dissolved in 100 cm.³ of ethyleneglycolmonomethylether. After acidification to pH 6 the usual additives such as hardeners, wetting agents and stabilizers and the necessary quantity of distilled water are added to the emulsion in order to obtain 1 kg. of emulsion ready for coating. The emulsion is coated on a suitable support and dried. After exposure through a grey wedge with a constant 0.15, the photographic material composed in this way is developed for 9 min. at 20° C. in a color-developing bath with the following composition:

Sodium hexametaphosphate -----	G. 2
N,N-diethyl-p-phenylene diamine hydrochloride ----	3
Sodium sulphite -----	4
Sodium carbonate -----	57
Hydroxylamine hydrochloride -----	1.5
Potassium bromide -----	1
Water to 1000 cm. ³ (pH=10.6).	

This material is rinsed for 30 minutes at 18 to 20° C. and fixed for 5 minutes at 20° C. in a fixing bath of the following composition:

Sodium thiosulphate -----	G. 200
Sodium bisulphite -----	25
Potassium alum -----	20
Sodium biacetate -----	20
Boric acid -----	7.5
Water to 1000 cm. ³ (pH=4.0).	

Next, the material is rinsed again for 10 minutes at 18 to 20° C. and treated for 5 minutes in a bleaching bath of the following composition:

Potassium ferricyanide -----	G. 100
Potassium bromide -----	15
Borax -----	20
Magnesium sulphate -----	50
Water to 1000 cm. ³ (pH=8.6).	

Then the material is rinsed again for 10 min. at 18 to 20° C. and fixed for 5 min. at 20° C. in a bath of the following composition:

Sodium thiosulphate -----	G. 130
Borax -----	20
Magnesium sulphate -----	50
Water to 1000 cm. ³ (pH=8.9).	

Rinsing is continued for another 10 min. at 18 to 20° and finally the material is dried. In the exposed and processed strip, besides a cyan image also a yellow-colored mask image is formed, with a gradation opposed to that of the cyan image, and which compensates the side absorption of the cyan image in the blue.

Example 2

To a ½ kg. of red-sensitive bromo-iodide emulsion (2% iodide) containing ¼ mol of silver halide are added 10 g. of N-(6'-cetylsulfonylphenyl)-1-hydroxy-2-

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naphthoic acid amide-3'-sodium sulfonate dissolved in 193 cm.³ of water and 7 cm.³ of an aqueous solution of sodium hydroxide 2 N and 10 g. of bis-(3,5-di-tert-butyl-4-hydroxyphenyl)-methane dissolved in 100 cm.³ of ethyleneglycol monomethylether. After acidification to pH 6 and after addition of the usual additives such as hardeners, wetting agents, and stabilizers and the necessary quantity of distilled water to obtain 1 kg. emulsion, the emulsion is coated on a suitable support and dried. After a further treatment according to Example 1, a cyan image is obtained wherein the disturbing influence of the side-absorption in the blue is reduced by the formed yellow masking image with opposite gradation to the cyan image.

Example 3

To a ½ kg. of red-sensitive bromo-iodide emulsion (2% iodide) containing ¼ mol of silver halide are added 10 g. of N-(6'-cetylsulfonylphenyl)-1-hydroxy-2-naphthoic acid amide-3'-sodium sulfonate dissolved in 193 cm.³ of water and 7 cm.³ of an aqueous solution of sodium hydroxide 2 N and 10 g. of 2,6-di-tert-butylphenol-4-carboxylic acid dissolved in 100 cm.³ of ethyleneglycol monomethylether. After acidification to pH 6 and after addition of the usual additives such as hardeners, wetting agents and stabilizers and the necessary quantity of distilled water to obtain 1 kg. emulsion, the emulsion is coated on a suitable support and dried. After a further treatment according to Example 1, a cyan image is obtained wherein the disturbing influence of the side-absorption in the blue is reduced by the formed yellow masking image with opposite gradation to the cyan image.

Example 4

To a ½ kg. of red-sensitive bromo-iodide emulsion (2% iodide) containing ¼ mol of silver halide are added 10 g. of N-(6'-cetylsulfonylphenyl)-1-hydroxy-2-naphthoic acid amide-3'-sodium sulfonate dissolved in 193 cm.³ of water and 7 cm.³ of an aqueous solution of sodium hydroxide 2 N and 10 g. of 2,6-di-tert-butyl-4-bromo-phenol dissolved in 100 cm.³ of ethyleneglycol monomethylether. After acidification to pH 6 and after addition of the usual additives such as hardeners, wetting agents and stabilizers and the necessary quantity of distilled water to obtain 1 kg. emulsion, the emulsion is coated on a suitable support and dried. After a further treatment according to Example 1, a cyan image is obtained wherein the disturbing influence of the side-absorption in the blue is reduced by the formed yellow masking image with opposite gradation to the cyan image.

To a ½ kg. of red-sensitive silver bromo-iodide emulsion (2% iodide) containing ¼ mol of silver halide are added 10 g. of N-(6'-cetylsulfonylphenyl)-1-hydroxy-2-naphthoic acid amide-3'-sodium sulfonate dissolved in 193 cm.³ of water and 7 cm.³ of an aqueous solution of sodium hydroxide 2 N and 10 g. of 2,6-di-tert-butyl-4-chlorophenol dissolved in 100 cm.³ of ethyleneglycolmonomethyl ether. After acidification to pH 6, the usual additives such as hardeners, wetting agents and stabilizers and the necessary quantity of distilled water are added to the emulsion in order to obtain 1 kg. of emulsion ready to be coated. After coating this emulsion forms part of a multilayer photographic material consisting of the following superposed layers in the indicated sequence: a support, an antihalation layer, a gelatin insulating layer, the above-mentioned red-sensitive emulsion layer with color coupler for cyan, a gelatin interlayer, a green-sensitive emulsion layer, a yellow filter layer, a blue-sensitive emulsion layer with color coupler for yellow and at last a gelatin overcoat as antistress layer. After exposure through a grey wedge with a constant 0.15 the photographic material is developed and further treated as in Example 1. A mainly cyan-colored image is obtained together with a yellow dye image in the red-sensitive layer, said yellow image being of opposite gradation in respect of the cyan dye image and reducing the disturbing influ-

ence of the side-absorption in the blue in the formed cyan image.

Example 6

To $\frac{1}{2}$ kg. of a red-sensitive bromo-iodide emulsion (2% iodide) containing $\frac{1}{2}$ mol of silver halide are added 9 g. of N-(6'-cetylsulfonylphenyl)-1-hydroxy-2-naphthoic acid amide-3'-sodium sulfonate dissolved in a mixture of 175 cm.³ of water and 6.3 cm.³ of an aqueous solution of sodium hydroxide 2 N, 2 g. of 1,2-dimethyl-4-amino-5-nonylpyrazolone-3 dissolved in 20 cm.³ of ethanol with a little sodium hydroxide and 2 g. of 2,6-di-tert-butyl-4-chlorophenol dissolved in 20 cm.³ of ethyleneglycolmonomethylether. After acidification with acetic acid to pH 6 and after addition of the usual additives such as hardeners, wetting agents and stabilizers and the necessary quantity of water, one obtains 1 kg. emulsion ready to be coated. After coating, this emulsion forms part of a multilayer photographic material consisting of the following superposed layers in the indicated sequence: a support, an antihalation layer, a gelatin insulating layer, the above-mentioned red-sensitive emulsion layer with color coupler for cyan, a gelatin interlayer, a green-sensitive emulsion layer, a yellow filter layer, a blue-sensitive emulsion layer with color coupler for yellow and at last a gelatin overcoat as antistress layer. After exposure through a grey wedge with a constant 0.15 the photographic material is developed and further treated as in Example 1. In the red-sensitive layer of both materials, besides a cyan image, also a yellow colored as well as a magenta colored mask image are formed, which images compensate the side absorptions of the cyan image in the blue and in the green part of the spectrum.

TABLE

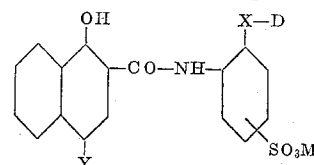
Preparation:	
1.....	
2.....	
3.....	
4.....	
5.....	

TABLE—Continued

Preparation:	
5.....	
10.....	
15.....	

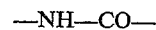
We claim:

1. A method of forming a color corrected image in a photographic element having at least one silver halide emulsion layer containing a color coupler of the formula:



wherein:

X represents a member selected from the group consisting of an oxygen atom, a sulfur atom, a



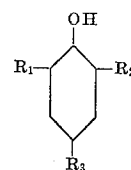
group, a —CO—NH— group, a $\text{—SO}_2\text{—NH—}$ group, a $\text{—NH—SO}_2\text{—}$ group, a —N—alkyl group and a sulfonyl group;

Y represents a member selected from the group consisting of an hydrogen atom and a halogen atom;

D represents an aliphatic radical comprising a linear chain of at least 5 and at most 20 carbon atoms;

M represents a member selected from the group consisting of an hydrogen atom, an alkali metal atom and an ammonium group,

and which is reactive with the oxidation product of an aromatic amino developing agent to form by color development a cyan dye image which absorbs a major portion of light in the red region of the visible spectrum, and undesirably absorbs a minor proportion of light in at least one other region of the visible spectrum, which method comprises treating said photographic element, after image-wise exposure and color development, with an oxidizing solution in the presence of a mask forming compound of the formula:



wherein:

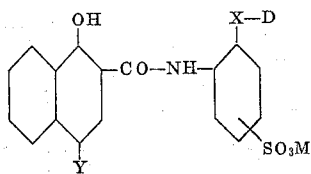
R_1 and R_2 each represents a sterically hindering group selected from the group consisting of tert-butyl, cyclohexyl and phenyl;

R_3 represents a member selected from the group consisting of a hydrogen atom, a halogen atom and a radical which is sufficiently unstable for splitting off on treatment of said mask forming compound with an oxidizing solution in the presence of said color coupler.

2. Method of forming a color corrected image according to claim 1 wherein the mask forming compound is incorporated in the photographic element, and the oxidizing solution is a photographic bleaching bath.

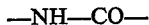
3. Method of forming a color corrected image in a

photographic element having superposed silver halide emulsion layers sensitive to different regions of the visible spectrum, at least one of said layers containing a color coupler of the formula:



wherein:

X represents a member selected from the group consisting of an oxygen atom, a sulfur atom, a



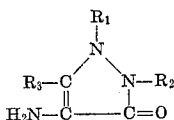
group, a $-\text{CO}-\text{NH}-$ group, a $-\text{SO}_2-\text{NH}-$ group, a $-\text{NH}-\text{SO}_2-$ group, a $-\text{N-alkyl}$ group and a sulfonyl group;

Y represents a member selected from the group consisting of an hydrogen atom and a halogen atom;

D represents an aliphatic radical comprising a linear chain of at least 5 and at most 20 carbon atoms;

M represents a member selected from the group consisting of an hydrogen atom, an alkali metal atom and an ammonium group,

and which is reactive with the oxidation product of an aromatic amino developing agent to form by color development a cyan dye image which absorbs a major proportion of light in the red region of the visible spectrum and undesirably absorbs a minor proportion of light in the green and blue regions of the spectrum, said photographic element containing a mask forming compound of the formula:

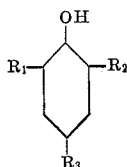


wherein:

R₁ represents a lower alkyl group;

R₂ represents a member selected from the group consisting of a lower alkyl group and an aryl group of the benzene series, and a substituted aryl group of the benzene series;

R₃ represents an aliphatic radical comprising a linear chain of at least 5 and at most 20 carbon atoms; and containing a mask forming compound of the formula:



wherein:

R₁ and R₂ each represents a sterically hindering group selected from the group consisting of tert-butyl, cyclohexyl and phenyl;

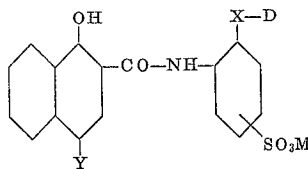
R₃ represents a member selected from the group consisting of a hydrogen atom, a halogen atom and a radical which is sufficiently unstable for splitting off on treatment of said mask forming compound with an oxidizing solution in the presence of said color coupler;

said color coupler being also reactive with the oxidation products of said mask forming compounds to form a magenta to red colored dye image and a yellow to orange colored dye image said dye images having a gradation opposite to that of said cyan dye image, and transmitting substantially all the light in the red region of the spectrum, said magenta to red colored dye image absorbing light in the green region of the spectrum, and said

yellow to orange colored dye image absorbing light in the blue region of the spectrum, which method comprises exposing said layers to light, developing at least said layer containing said color coupler, by color development with an aromatic amino developing agent, whereby said cyan dye image is formed in the developed areas by coupling, leaving in the undeveloped areas of said one layer residual color coupler, and treating at least said layer containing said residual color coupler, and said mask forming compounds, with a bleaching bath, said treatment resulting in the oxidation of said mask forming compounds, whereby said magenta to red colored dye image and said yellow to orange colored dye image is formed by coupling said oxidized mask-forming compounds with said residual color coupler.

4. Method of forming a color corrected image according to claim 3, wherein said mask-forming compounds are contained in at least said one layer containing said color coupler.

5. Photographic element having superposed silver halide emulsion layers sensitive to different regions of the visible spectrum, at least one of said layers containing a color coupler of the formula:



wherein:

X represents a member selected from the group consisting of an oxygen atom, a sulfur atom, a



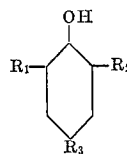
group, a $-\text{CO}-\text{NH}-$ group, a $-\text{SO}_2-\text{NH}-$ group, a $-\text{NH}-\text{SO}_2-$ group, a $-\text{N-alkyl}$ group and a sulfonyl group;

Y represents a member selected from the group consisting of an hydrogen atom and a halogen atom;

D represents an aliphatic radical comprising a linear chain of at least 5 and at most 20 carbon atoms;

M represents a member selected from the group consisting of an hydrogen atom, an alkali metal atom and an ammonium group,

and which is reactive with the oxidation product of an aromatic amino developing agent to form by color development a cyan image which absorbs a major proportion of light in the red region of the visible spectrum, and undesirably absorbs a minor proportion of light in at least one other region of the visible spectrum, and containing a mask forming compound of the formula:



wherein:

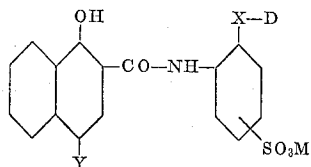
R₁ and R₂ each represents a sterically hindering group selected from the group consisting of tert-butyl, cyclohexyl and phenyl;

R₃ represents a member selected from the group consisting of a hydrogen atom, a halogen atom and a radical which is sufficiently unstable for splitting off on treatment of said mask forming compound with an oxidizing solution in the presence of said color coupler,

said color coupler being also reactive with the oxidation product of said mask-forming compound to form a secondary dye image having a gradation opposite to that of said cyan dye image, and absorbing light in at least one of said unwanted minor absorption regions but transmit-

ting substantially all the light in the red absorption region of the spectrum.

6. Photographic element having superposed silver halide emulsion layers sensitive to different regions of the visible spectrum, at least one of said layers containing a color coupler of the formula:



wherein:

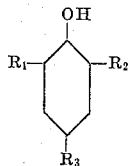
X represents a member selected from the group consisting of an oxygen atom, a sulfur atom, a —NH—CO— group, a —CO—NH— group, a —SO₂—NH— group, a —NH—SO₂— group, a —N-alkyl group and a sulfonyl group;

Y represents a member selected from the group consisting of an hydrogen atom and a halogen atom;

D represents an aliphatic radical comprising a linear chain of at least 5 and at most 20 carbon atoms;

M represents a member selected from the group consisting of an hydrogen atom, an alkali metal atom and an ammonium group,

and which is reactive with the oxidation product of an aromatic amino developing agent to form by color development a cyan image which absorbs a major proportion of light in the red region of the visible spectrum, and undesirably absorbs a minor proportion of light in the green and blue regions of the visible spectrum, and containing a mask forming compound of the formula

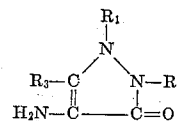


wherein:

R₁ and R₂ each represents a sterically hindering group selected from the group consisting of tert-butyl, cyclohexyl and phenyl;

R₃ represents a member selected from the group consisting of a hydrogen atom, a halogen atom and a radical which is sufficiently unstable for splitting off on treatment of said mask forming compound with an oxidizing solution in the presence of said color coupler,

and containing a mask-forming compound of the formula:



wherein:

R₁ represents a lower alkyl group;

R₂ represents a member selected from the group consisting of a lower alkyl group and an aryl group of the benzene series, and a substituted aryl group of the benzene series;

R₃ represents an aliphatic radical comprising a linear chain of at least 5 and at most 20 carbon atoms; said color coupler being also reactive with the oxidation products of said mask forming compounds to form a yellow to orange colored dye image and a magenta to red colored dye image, said dye images having a gradation opposite to that of said cyan image, and transmitting substantially all the light in the red region of the spectrum, said magenta to red colored dye image absorbing light in the green region of the spectrum, and said yellow to orange colored dye image absorbing light in the blue region of the spectrum.

No references cited.