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3,095,302

METHOD OF INHIBITING DISCOLORATION OF COLOR PHOTOGRAPHIC LAYERS CONTAINING DYE IMAGES AND RESULTING PHOTOGRAPHIC PRODUCTS

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This invention relates to color photography and more particularly to methods for preventing discoloration of photographic layers containing dye images. The invention also includes photographic layers or elements stabilized against discoloration according to the new methods.

The system of three-color photography suggested by Fischer in U.S. Patent 1,055,155, issued March 4, 1913, forms the basis for certain color photographic processes and products. In one embodiment this process involves the incorporation of different color-forming coupler compounds in each of three superposed differently color-sensitized silver halide emulsion layers. Each of the three couplers is capable of producing a color complementary to the sensitivity of the layer in which it is incorporated by reaction with the oxidation products of certain types of photographic developing agents. In this way a developed silver image and a colored dye image are formed simultaneously in each of the three superposed emulsion layers. The silver images and residual undeveloped silver halide may then be removed from the multilayer photographic element by bleaching, fixing and washing according to now well-known methods. Alternatively, the color-forming couplers may be incorporated in the developer rather than in the emulsion layers as disclosed in Fischer U.S. Patent 1,102,028, issued June 30, 1914.

The couplers suggested by Fischer contain phenolic hydroxyl or ketomethylene groups capable of reacting with the oxidation products of aromatic amino developing agents during photographic development to form indophenol, indamine, indoaniline or azomethine (including quinone-immine) dyes. Dyes produced by developing with aminophenols in the presence of a phenol or naphthol coupler are indophenol dyes, those produced by developing with a phenylene diamine type developer in the presence of an aniline coupler, phenol or naphthol couplers or reactive methylene compounds are indamine, indoaniline and azomethine dyes, respectively. Azomethine and indoaniline dyes are present in many of the processed photographic color products produced by current photographic processes.

While the process of Fischer U.S. Patent 1,055,155 in which the color-forming couplers are incorporated in the emulsion layers is theoretically feasible it has not been entirely successful due to the tendency of the couplers to diffuse out of their respective emulsion layers during coating or processing. For this reason it has been proposed to react the coupler molecules with high molecular weight or colloidal bodies to render the couplers non-diffusing in gelatin or other colloidal media. It has also been proposed to mix the couplers with a water insoluble colloid such as a natural or synthetic resin or a cellulose ester and to subsequently disperse this mixture in the gelatin emulsion. Methods of this type are disclosed in Martinez U.S. Patent 2,269,158, issued January 6, 1942, and in Mannes and Godowsky U.S. Patents 2,304,939 and 2,304,940, issued December 15, 1942. These patents also disclose specific couplers adapted to be dispersed in emulsion layers as just described. Other couplers useful in methods of this type are disclosed in Jelley et al. U.S.

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Patent 2,322,027, issued June 15, 1943, Fierke et al. U.S. Patent 2,801,171, issued July 30, 1957, and in Porter et al. U.S. Patent 2,369,489, issued February 13, 1945, as well as in numerous other patents.

Specific couplers useful in photographic color processes in which the couplers are not dispersed in a water immiscible solvent are disclosed in the following representative references: Mannes and Godowsky U.S. Patent 2,039,730, issued May 5, 1936, hydroxy diphenyl couplers which form blue or blue-green dyes; Mannes and Godowsky U.S. Patent 2,108,602, issued February 15, 1938, acetoacetamides and cyanoacetamides, containing reactive methylene groups, which form yellow dyes; Mannes and Godowsky U.S. Patent 2,115,394, issued April 26, 1938, organic compounds containing the cyanoacetyl group which form red and magenta dyes; and Richey and Jensen U.S. Patent application Serial No. 670,900, filed July 10, 1957, water soluble cyan, magenta and yellow dye-forming couplers.

The developing agents useful for color development of emulsion layers containing couplers of the type described above or for the development of emulsion layers in the presence of these couplers include the well-known primary aromatic amino silver halide developing agents such as the phenylenediamines including the alkyl phenylenediamines and alkyl toluene diamines. These developing agents are usually used in the salt form such as the hydrochloride or sulfate which is more stable than the amine. The p-amino phenols and their substitution products may also be used where the amino group is unsubstituted. The N-alkyl sulfonamido alkyl-p-phenylenediamine agents of Weissberger U.S. Patent 2,193,015, issued March 12, 1940, are also very useful. All of the developing agents have an unsubstituted amino group which enables the oxidation product of the developer to couple with the color-forming compounds to form a dye image.

Many indophenol, indamine, indoaniline and azomethine dyes are relatively unstable to light with the result that dye images in finished commercial color pictures have a tendency to fade, especially when subjected to intense illumination for extended periods of time. This is true whether the source of illumination is sunlight or tungsten or fluorescent lamps. The cyan dyes are generally relatively less susceptible to fading than the other dyes commonly used in color photography. In processes in which the couplers are incorporated in the emulsion layers or in plain gelatin layers in the film, further difficulty is caused by residual unused coupler which tends to print out under the influence of light especially in the high light areas of the picture. Magenta dye-forming couplers are generally more susceptible to print-out than others.

The nearest solution to the problem of fading of dye images and print-out of residual coupler in photographic layers would be to use only couplers and dyes which are inherently stable to light. This is seldom feasible, however, since the number of couplers and dyes suitable for use in commercial photographic color processes is somewhat limited and it is often the case that the most suitable materials are not as stable as might be desired. Therefore, the most satisfactory approach to the fading and print-out problem has been to choose couplers and dyes suitable for the particular photographic process and then attempt to protect these compounds against the usually deleterious effects of light.

In general, two methods have been suggested to prevent discoloration of photographic layers. One of these comprises overcoating the photographic layer to be protected with a substance capable of absorbing ultraviolet light. Methods of this type are disclosed in Salminen and Allen U.S. Patent 2,632,701, issued March 24, 1953,

and Edgerton and Staud U.S. Patent 2,747,996, issued May 29, 1956. The other method referred to above comprises treatment of photographic layers containing dye images with certain chemical compounds, particularly organic reducing agents or anti-oxidants, in order to stabilize the dye images and any residual coupler in the photographic layer. Methods of this type are disclosed in Vittum U.S. Patent 2,384,658, issued September 11, 1955, and Mackey U.S. Patent 2,579,435, issued December 18, 1951. Methods of the latter type have been found to be entirely empirical. For example, although the reducing agents of the Vittum patent are useful others of similar reducing properties have no effect on the stability of photographic dye images. Further, many reducing compounds which might suggest themselves as stabilizing agents not only have no stabilizing properties but actually cause stain or destruction of dye images in photographic layers. It has, therefore, been difficult to find compounds having appreciable dye stabilizing or anti-print-out properties which are also free from other undesirable characteristics. Therefore, although the above and other methods have been suggested in the art for protecting colored photographic elements against discoloration due to fading or prin-out, none has proven to be a complete solution to the problem and the search for new methods has continued.

It is an object of the present invention to provide improved methods for preventing the discoloration of photographic layers containing dye images subject to fading or print-out under the influence of light. It is a further object of the invention to provide color photographic materials including films, transparencies and prints stabilized against discoloration under the influence of light. Other objects will become apparent from the following description of the invention.

The methods of the present invention for preventing the discoloration of water permeable photographic layers containing dye images comprise treating such layers with aqueous solutions of certain organic compounds in order to introduce sufficient quantities of these treating agents into the photographic layers to inhibit fading of the dye images or print-out of any residual dye-forming coupler therein. In practice, the photographic element or layer containing the dye image, but substantially free from developed silver, silver halide and other soluble salts, is immersed in a bath comprising an aqueous solution of one of the treating agents of the invention. The photographic layer is allowed to remain in the bath until it has absorbed sufficient treating solution to inhibit discoloration. The photographic layer is then removed from the bath and allowed to dry containing the absorbed treating agent. Optionally, surplus treating solution may be removed from the surface of the photographic element or layer by means of a squeegee, rapid water rinse or other suitable means prior to drying. When a water rinse is employed, however, care must be taken not to remove absorbed treating agent from the treated layer.

As noted above, the dye images in the photographic layers to be treated according to the invention are formed by color development of latent silver halide images in the presence of color-forming coupler compounds by means of a primary aromatic amino developing agent. The dye images formed in this way may be composed of indophenol, indamine, azomethine or indoaniline dyes. The azomethine and indoaniline types are currently produced in many color photographic processes and the methods of the present invention are especially suitable for the stabilization of these dyes against fading and of the corresponding couplers against print-out. The developed silver image and undeveloped silver halide present in the photographic layer after color development are removed by conventional methods prior to treatment according to the invention.

The following compounds comprise the treating agents of the present invention:

- I. Water soluble salts of 6-sulphobenzothiazole-2-thiol and derivatives thereof having one or more lower alkyl substituents on the benzene ring. The alkali metal salts of these compounds are preferred, e.g. sodium 6-sulphobenzothiazole-2-thiol.
- II. Aliphatic amino acids, both unsubstituted and substituted with alkyl or hydroxy groups, especially amino acids containing from 2 to 4 carbon atoms, and the dipeptides of these acids.

Preferred compounds include:

Glycine
 α -Alkyl glycines
 α -Hydroxy-alkyl glycines
N-Hydroxy-alkyl glycines
 α -Alanine
 β -Alanine
Sarcosine
N,N-Dimethyl glycine
Betaine
Serine; and

Dipeptides of the above such as glycyl glycine

- III. Polyhydroxy compounds containing at least four hydroxyl groups.

A. Tetrahydroxy compounds

3,3,5,5-tetrahydroxymethyl tetrahydro- γ -pyrone
3,3,5,5-tetrahydroxymethyl tetrahydropyran-4-ol
quinic acid

B. Sugars, including monosaccharides and disaccharides of both reducing and non-reducing types and the monoamino derivatives of these sugars

Preferred compounds include:

1. Hexoses such as

Glucose
Galactose
Mannose
Fructose;

2. Hexose-Hexoses such as

Maltose
Lactose
Sucrose; and

3. Monoamino derivatives of hexoses, e.g.

Glucosamine (which may be employed as the hydrochloride or other acid salt)

C. Hexitol compounds and their methylene ethers such as)

Sorbitol
Mannitol
Inositol
2,4-methylene-D-sorbitol

- IV. Guanidine, the alkyl, hydroxyalkyl and aminoalkyl derivatives of guanidine and the acid salts of these compounds.

Preferred compounds include:

Guanidine hydrochloride
 β -Hydroxyethyl guanidine sulphate
Methyl guanidine sulphate

- V. Urea and O-alkyl derivatives thereof, e.g. methyl isouronium sulphate

The term alkyl as employed herein is intended to include alkyl groups of such size that they do not render the treating agents too insoluble in water to achieve a solution concentration within the range required by the present invention, i.e. from about 2.5 to about 15% by weight. Of the alkyl substituted compounds, those containing lower alkyl groups having from 1 to about 6 carbon atoms are most useful in the present invention; those containing methyl, ethyl and propyl groups being especially suitable.

Although the treating agents of the present invention have, for convenience in listing, been divided in to five

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groups of compounds having a community of chemical and physical properties and although all of the disclosed compounds are capable of stabilizing photographic dye images and color-forming couplers against fading and print-out respectively, each treating agent of the invention is distinct from the others in its stabilizing effect and its utility for this purpose is not predictable.

Treating agents to be useful in the present invention must not, of course, be capable of causing discoloration of photographic layers containing dye images or dye destruction under the conditions of use. It should also be noted that the treating agents of groups I and IIIB 3, i.e. the 6-sulphobenzothiazole-2-thiols and the monoamine derivative of hexoses, e.g. glucosamine, are most useful for the treatment of photographic color materials of the type in which the dyes and couplers are not dispersed in a water immiscible solvent.

The concentration of treating agent in the aqueous treating solutions of the invention may range from a lower operable limit below which insufficient treating agent is absorbed by the treated photographic layer to provide an appreciable increase in the stability of any dye image or residual coupler therein to an upper limit above which treating agent tends to crystallize out of the solution on the surface of the treated layer. Subject to these limits, most useful treating solutions contain from about 2.5 to about 15% of treating agent by weight. The optimum concentration of the treating solution varies with the particular treating agent employed and with the particular dyes and couplers treated as well as other factors. In general, concentrations of treating agent from about 7.5 to 10% are preferred in most cases. It should also be recognized that the nature of the photographic layer will have an effect upon the optimum concentration. For example, porous photographic elements such as photographic paper, as opposed to film, require larger amounts of treating agent for the same degree of stabilization.

The temperature at which the treatments are carried out is not critical; it being preferred, as a matter of convenience, to employ the treating solutions at room temperature. It is, of course, important that the temperature of the treating solutions should not be high enough to damage the photographic layer or element being treated or to decompose or otherwise adversely effect the treating agent.

The treating time required in the present invention varies with the permeability to the treating solution of the photographic elements being treated. In general, about 10 minutes immersion in the treating bath is sufficient in most cases although shorter or longer times may often be employed with success. It is, of course, essential that the photographic element be immersed long enough to absorb sufficient treating agent to provide a significant improvement in the stability of the color element against discoloration.

The invention will now be described more specifically in the following examples which have been selected for purposes of illustration only and are not to be construed as limiting the scope of the invention. All concentrations of treating solutions given herein are expressed as percent by weight of treating agent in the solution.

Example 1.—Treating Agents of Groups I and IIIB 3

A processed, water permeable, full color transparency containing magneta, cyan and yellow dye images (produced by a reversal color process) composed of indoaniline and azomethine dyes formed by color development and substantially free from developed silver and residual silver halide was immersed in a 10% aqueous solution of sodium 6-sulphobenzothiazole-2-thiol at room temperature for about 10 minutes. At the end of this time the transparency, containing absorbed treating solution, was removed from the bath and given a water rinse for about 2 seconds. Surplus liquid was then removed

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from the surface with a squeegee. The transparency was finally allowed to dry containing absorbed treating agent.

When the dry transparency was exposed to intense tungsten illumination in a fadometer for an extended period of time it was found that the stability of the magneta and yellow images against fading, as measured by loss of density, was superior to that of similar dye images both in an untreated transparency and in a water-washed transparency used as controls. The cyan image was inherently relatively stable under the test conditions. The color transparencies treated in this example were of the type produced according to references such as Mannes and Godowsky U.S. Patents 2,039,730; 2,108,602; 2,115,394 and Richey and Jensen U.S. Patent application Serial No. 670,900, filed July 10, 1957, all referred to above, in which the dye-forming couplers are not dispersed in a water immiscible solvent.

The procedure of the above example was repeated employing aqueous solutions of the hexose monoamine treating agents of group IIIB 3. For example, a 5% aqueous solution of the sodium salt of glucosamine hydrochloride was used to treat a color transparency of the type referred to above. The treated transparency was found to have improved resistance to discoloration under the influence of light when compared to controls consisting of similar untreated color elements and to untreated elements given a water wash.

Example 2.—Treating Agents of Group II

A processed water permeable, full color transparency, containing magneta, cyan and yellow dye images (produced by a reversal color process) composed of indoaniline and azomethine dyes formed by color development and substantially free from developed silver and residual silver halide was immersed in a 10% aqueous solution of glycine at room temperature for about 10 minutes. At the end of this time the transparency containing absorbed treating solution was removed from the bath and surplus liquid was removed from the surface with a squeegee. Rapid water washing of the transparency prior to squeegeeing is optional. The transparency was then allowed to dry containing absorbed glycine.

When the dry transparency was exposed to intense tungsten illumination in a fadometer for an extended period of time it was found that the above treatment enhanced the stability of the colored images in the transparency in comparison with the stability of the images in similar untreated transparencies. The full color transparencies employed in this example were of the type described in Example 1 in which the dye-forming couplers are not dispersed in a water immiscible solvent.

The procedure of the above example was repeated substituting other aliphatic amino acids and dipeptides of group II for the glycine treating agent. Additional treatments were also conducted in the manner described above employing the aliphatic amino acid and dipeptide treating agents of group II in the treatment of color prints both of the negative-positive and reversal types as well as in the treatment of transparencies in which the dye images were produced by couplers incorporated in the emulsion layers as dispersions in water immiscible solvents, e.g. as disclosed in U.S. Patents 2,269,158; 2,304,939; 2,304,940; 2,322,027; 2,801,171 and 2,369,489 referred to above. It was found that all of the treating agents of group II improve the stability of colored dye images in the several types of photographic color materials in varying degrees. On the basis of these treatments, the preferred treating agents of group II are glycine, glycyl glycine and N-hydroxymethyl glycine.

Example 3.—Treating Agents of Group III

In a series of treatments, processed water permeable, full color transparencies, both of the type in which the couplers are dispersed in a water immiscible solvent and

of the type in which the couplers are not so dispersed, and processed color prints of both the negative-positive and reversal types, all containing magenta, cyan and yellow dye images composed of indoaniline and azomethine dyes formed by color development, and all substantially free from developed silver and residual silver halide, were immersed in 5%, 7.5% and 10% aqueous solutions of 3,3,5,5-tetrahydroxymethyl tetrahydropyran-4-ol at room temperature for about 10 minutes. At the end of this time the color photographic elements containing absorbed treating solution were removed from the baths and surplus liquid was removed from the surface with a squeegee. Rapid water washing of the photographic elements prior to squeegeeing is optional. The color elements were then allowed to dry containing absorbed treating agent. When the dry photographic elements were exposed to intense tungsten illumination in a fadometer for an extended period of time it was found that the stability of the colored images against fading and of residual coupler against print-out had been improved in every case by the above treatment when compared to similar untreated color elements.

The above series of treatments was repeated substituting 3,3,5,5-tetrahydroxymethyl tetrahydro- γ -pyrone for the pyranol treating agent. In another treatment conducted in the manner described above, quinic acid was used to treat color prints and transparencies. It was found that both of these treating agents also improved the stability of the various types of photographic color materials against discoloration in varying degrees.

The general procedure described above was employed in another series of treatments in which the treating agents were certain sugars and sugar derivatives, hexitols and methylene ethers of hexitols. The sugars included monosaccharides such as the hexoses and disaccharides such as the hexose-hexoses. The sugar derivatives included monoamino derivatives of the various sugars noted above. The following specific compounds are representative of the treating agents of group III tested in this series of treatments:

Glucose	Sucrose
Galactose	Sorbitol
Mannose	Mannitol
Fructose	Inositol
Maltose	2,4-methylene-D-
Lactose	Sorbitol

These treating agents were employed as 2.5 to 15% aqueous solutions as are the other treating agents of the invention. It was found that concentrations of about 5%, 7.5% or 10% were most useful in the majority of cases. All types of color photographic elements including transparencies and prints were improved in stability to discoloration by these treatments.

It should be noted that when polyhydroxy compounds, including quinic acid, the hexitols, hexitol methylene ethers and the sugars of the invention, are employed in the treatment of color photographic materials which are to be subjected to prolonged conditions of high temperature and humidity such as are found in the tropics, it may be advisable to add a preservative to the treatment bath to inhibit mold growth. Suitable preservatives for this purpose include zinc fluorosilicate and pentachlorophenol and its derivatives, the former being used at concentrations up to about 0.5% and the latter at concentrations up to about 1% by weight. The use of pentachlorophenol derivatives, such as sodium pentachlorophenate, in sugar-containing treating baths was found, in some instances, to increase the stability of the yellow dyes in reversal color prints to a greater degree than treatment with the sugar alone.

Example 4.—Treating Agents of Group IV

In a series of treatments, processed water permeable, full color transparencies and prints containing magenta, 75

cyan and yellow dye images composed of indoaniline and azomethine dyes formed by color development and substantially free from developed silver and residual silver halide were immersed in 10% aqueous solutions of the guanidine compounds of group IV at room temperature for about 10 minutes. At the end of this time the photographic elements containing absorbed treating solution were removed from the baths and surplus liquid was removed from the surface of the elements with a squeegee. Rapid water washing of the transparency or print prior to squeegeeing is optional. The treated elements were then allowed to dry containing absorbed treating agent. When the dry color elements were exposed to intense tungsten illumination in a fadometer for an extended period of time it was found that the stability of the colored images had been improved by the above treatment in every case when compared to similar untreated color photographic elements.

Specific treating agents employed in this series of tests included guanidine hydrochloride, methyl guanidine sulphate, and aminoguanidine sulphate among others.

Example 5.—Treating Agents of Group V

A processed water permeable, full color transparency containing magenta, cyan and yellow dye images composed of indoaniline and azomethine dyes formed by color development and substantially free from developed silver and residual silver halide was immersed in a 10% aqueous solution of urea at room temperature for about 10 minutes. At the end of this time the transparency containing absorbed treating solution was removed from the bath and surplus liquid was removed from the surface with a squeegee. A rapid water wash of the transparency, as noted previously, may be employed prior to squeegeeing if desired. The transparency was then allowed to dry containing absorbed urea. When the dry transparency was exposed to intense tungsten illumination in a fadometer for an extended period of time, it was found that the stability of the colored images had been improved by the above treatment when compared to similar untreated transparencies. The full color transparency employed in this example was of the type described in Example 1 in which the dye forming couplers are not dispersed in a water immiscible solvent.

The above experiment was repeated substituting an O-alkyl-substituted urea, methyl isouronium sulphate, for the urea treating agent. In further experiments conducted in the manner described above, treating agents of group V were used to treat color prints both of the negative-positive and reversal types as well as transparencies in which the dye images were produced by couplers incorporated in the emulsion layers in water immiscible solvents. It was found that the treating agents of group V improve the stability of colored dye images in the several types of photographic color materials in varying degrees.

As noted above, the treatments of the present invention are applied to photographic elements or layers which contain dye images but are substantially free from developed silver or residual silver halide. The methods by which the developed silver image formed on color development and any residual silver halide are removed from color photographic elements are well-known in the art. One method commonly employed is initiated by bleaching the silver image with a solution of potassium ferricyanide and potassium bromide. After this treatment the photographic element is fixed with sodium thiosulfate solution and finally washed with water to remove the soluble salts. A method of this type is described in Mannes, Godowsky, and Wilder U.S. Patent 2,252,718, issued August 19, 1941.

In practicing the methods of the present invention it may be found, for example, that when a three color multi-layer photographic transparency, film or print containing different types of dyes is treated, the treatment may prove more effective for one or more of the dyes than for the

remainder. As noted above, cyan dyes are normally relatively stable and therefore the improvement in their stability will not ordinarily be as marked as for other dyes. Similarly, inasmuch as magenta dye-forming couplers are particularly susceptible to print-out, the improvement in the stabilization of these materials will generally be greater than for other couplers.

As noted above, it is important in the present invention that significant quantities of the treating agents remain in the finished color photographic element in order to insure the desired stabilization of dye images and residual coupler against fading and print-out, respectively. In this connection it may be noted that Mannes and Godowsky in U.S. Patent 2,059,887, issued November 3, 1936, teach the use of sugar in methanolic solution in the processing of color photographic elements in order to limit the penetration of the processing solution to the outer layers of the emulsion. The photographic element treated in this way requires further processing, for example stopping, and adequate washing to remove residual chemicals from the emulsion. Such treatment removes the sugar and therefore, the advantages of the present invention are not achieved. The optional rapid water washing of materials treated according to this invention must be carried out in such a way that only surplus treating agent on the surface of the element is removed leaving treating agent within the finished photographic element.

It should be understood that the present invention has been described with reference to the color processes, couplers and developing agents disclosed in representative U.S. patents and patent applications for purposes of illustration only and that other photographic color processes, sensitized color elements, couplers and developers may also be employed as will be obvious to those skilled in the art and that for this reason the invention is to be taken as limited only by the scope of the appended claims.

We claim:

1. The method of inhibiting the discoloration of a water permeable photographic layer containing an image composed of a dye selected from the group consisting of azomethine, indoaniline, indophenol and indamine dyes, said layer being substantially free from developed silver and residual silver halide which comprises inhibiting in said layer an aqueous solution of a compound selected from the group of polyhydroxy compounds consisting of:

3,3,5,5-tetrahydroxymethyl tetrahydro- γ -pyrone
3,3,5,5-tetrahydroxymethyl tetrahydropyran-4-ol
quinic acid
hexoses
hexose-hexoses
monoamino derivatives of hexoses and their salts
hexitols
methylene ethers of hexitols

and allowing said layer to dry containing sufficient absorbed treating agent to inhibit discoloration of said layer.

2. The method of claim 1 in which said compound is 3,3,5,5-tetrahydroxymethyl tetrahydropyran-4-ol.

3. As an article of manufacture, a color photographic element having at least one developed and fixed photographic layer containing an image composed of a dye selected from the group consisting of azomethine, indoaniline, indophenol and indamine dyes, said layer being substantially free from developed silver and residual silver halide, and having incorporated therein a compound selected from the group of polyhydroxy compounds consisting of:

3,3,5,5-tetrahydroxymethyl tetrahydro- γ -pyrone
3,3,5,5-tetrahydroxymethyl tetrahydropyran-4-ol
quinic acid
hexoses
hexose-hexoses
monoamino derivatives of hexoses and their salts
hexitols
methylene ethers of hexitols

in an amount sufficient to inhibit said layer against discoloration.

4. A color photographic element as defined in claim 3 wherein said compound is 3,3,5,5-tetrahydroxymethyl tetrahydro- γ -pyrone.

5. A color photographic element as defined in claim 3 wherein said compound is 3,3,5,5-tetrahydroxymethyl tetrahydropyran-4-ol.

6. A color photographic element as defined in claim 3 wherein said compound is glucose.

7. A color photographic element as defined in claim 3 wherein said compound is sucrose.

8. A color photographic element as defined in claim 3 wherein said compound is inositol.

9. The method of claim 1 in which said compound is 3,3,5,5-tetrahydroxymethyl tetrahydropyran-4-ol.

10. The method of claim 1 in which said compound is glucose.

11. The method of claim 1 in which said compound is sucrose.

12. The method of claim 1 in which said compound is inositol.

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