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2,814,565

PROCESS FOR PRODUCING PHOTOGRAPHIC MULTICOLOR IMAGES

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This invention relates to multicolor photographic processes and particularly to processes involving sequential formation of color components as dye images in photosensitive emulsions; to certain new steps in such processes, to certain novel sensitizing solutions, and to products resulting from the use of such solutions. This application is a continuation-in-part of my co-pending application Serial No. 302,816, filed August 5, 1952, now abandoned.

It is known that color photographs can be produced by preparing color separation negatives of the object to be reproduced, sequentially exposing a single silver halide emulsion layer to the properly registered separation negatives, developing the emulsion, after each exposure, with a color-forming developer to form the appropriate dye-image and a silver image, rehalogenating the silver image after each development, and finally removing all silver and silver salts from the emulsion. Such processes are described in United States patents granted to Hanson et al., No. 2,443,909; Yanket, No. 2,244,589; Ryan et al., No. 2,471,547; and Bunting, No. 2,333,359.

From an examination of typical processes described in the prior art, it is evident that the color separation negatives which are generally the starting point for the production of a final multi-color image are prepared by photographing the object to be reproduced on a multiplicity of negative films, each being exposed through a filter of a different and suitable color. In the case of each negative, an image is formed independently of the other images and filters used to produce them. However, generally, in forming the color components of the color photograph in a single emulsion, only the color component image which is first formed is produced independently of the other images. The second color component image to be formed is initially produced by light which must pass through the first color component image. Similarly, if three color components are employed, the third color component is initially produced by light which passes through both the first and second color component images. These color component images consist of dyes whose light transmission cannot be predicted accurately, but it is known that if no steps are taken to correct for their effective light absorption, the color balance of the final picture will be in error, possibly even to such an extent as to make it unusable.

In the prior art, a variety of methods have been employed to effect a measure of correction, thereby to approach true color balance in the finished picture. However, the practices of the art have uniformly resulted only in an approximation of true color balance. It was heretofore believed that the correction to achieve color balance could be accomplished by equalizing the sensitivity of the rehalogenated and the unexposed portions of the emulsion layer, and such equalization has heretofore consisted in a desensitization of all parts of the emulsion layer to a degree which approaches the same low level

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as that which could be produced by the known techniques of rehalogenization. While the results of this type of corrective desensitization give commercially acceptable, although not actually true color balance between the first and second color component images, the method cannot be repeated satisfactorily in correcting for the absorption of printing light by two color component images if a third color component is to be used.

It is an object of this invention to provide a photographic multicolor process involving sequential formation of color components in a photosensitive emulsion, wherein color imbalance in the second and following color components of the multicolor image, caused by absorption and desensitizing action of the dyes in the previously formed color images, can be corrected. It is a further object of this invention to provide a novel method for rehalogenation of developed silver. Another object of the invention is to provide a method for controlling the sensitivity of rehalogenated silver halide emulsions. A still further object of the invention is to provide an emulsion containing a color component image and a non-spontaneously developable latent image of enhanced sensitivity. Other objects of the invention will be apparent from the disclosure hereinafter following.

In accordance with the above and other objects of my invention, I have discovered a new method for controlling the emulsion sensitivity characteristics which exist in an emulsion after the formation of a first color component therein.

When a multicolor image is formed in a single emulsion layer by the process involved in this invention, each color image is formed in conjunction with a silver image, by development using a conventional color-forming developing agent for silver halide. Generally, only a portion of the latent image is developed to metallic silver. For further production of color component images, it is necessary to effectively remove metallic silver and to change the undeveloped latent image to a form which is not spontaneously developable. The rehalogenation processes heretofore used form silver halide which is of much lower sensitivity to light than the original unexposed silver halide in the emulsion, and at the same time, destroy any latent image which may be present. The resulting condition of the emulsion is unsuitable for the formation of further images in the emulsion, since the emulsion contains areas of varying sensitivity. To correct this condition, the prior art employed methods whereby the sensitivity of the unexposed portions of the emulsion were depressed to substantially the same level of sensitivity as existed in the reformed silver halide. One of the methods employed in the prior art involves a uniform exposure of the emulsion at this point to light under critically controlled conditions, thereafter subjecting the emulsion to a rehalogenating bath containing an oxidizing agent and a soluble halide. This treatment can be carried out either with or without development of the latent image formed by the uniform exposure. The result of the treatment is to destroy the latent image which is formed, and the sensitivity of the unexposed silver halides in the emulsion is depressed. It has heretofore been found that treatment of photographic emulsions with oxidizing agents causes a decrease in the sensitivity of those emulsions, proportional to the strength of the oxidizing agent and the duration of treatment. Further, if the emulsion is exposed to light before treatment with the oxidizing agent there is even greater loss of sensitivity and effective destruction of the latent image in the process. However, the depression of sensitivity after exposure to light and treatment with an oxidizing agent is almost independent of the strength of the oxidizing agent and the

duration of treatment; and repetition of the procedure causes substantially no further desensitisation. The effect of the first exposure is to produce in the emulsion layer a silver halide which has reached a relatively low and thereafter relatively constant degree of sensitivity. The prior art methods involving the use of light exposure and oxidizing rehalogenation therefore are not useful for making more than one color balance correction by adjustment of sensitivity in the emulsion layer; and that correction is made only as to render uniform the sensitivity variations in different areas of the emulsion layer, without regard to the complex absorption characteristics of the color component images which are present therein.

By "non-image portion" I intend to refer in this specification to that portion of an emulsion which, in the sequential formation of the color component images of a multicolor image, has not been exposed to a color record prior to its exposure for printing of the third color component of the sequence. By "image portion" I intend to refer herein to any portion of the emulsion containing a color component image, alone or together with a silver image therein.

In my new method for providing color balance in photographic multicolor images, I have found that the sensitivity of the rehalogenated silver which is formed in the process after production of the first color component image and/or any latent image substance present can be maintained at a level which approaches or even surpasses that of the non-image silver halide present in the emulsion. This is accomplished by treating the emulsion layer containing a first color component image and a developed silver image with a solution containing an oxidizing agent, ammonium ions, and a many-fold excess of halide ions. This is effectively an oxidizing-rehalogenating solution, which because of its novel effects can also be termed a sensitizing rehalogenating solution.

I believe that the mode of action of my novel sensitizing rehalogenating solution is as follows: the emulsion layer as it exists after formation of a first color component image and a developed silver image contains the following entities: a silver image developed from a part of the latent image produced by exposure to light through the separation negative; a dye image in situ with the silver image; latent image substance, which was not reduced to image silver; and non-image silver halide. As a result of the treatment with the oxidizing solution of my invention, the following results are accomplished: the dye image is unchanged; the non-image silver halide retains a high level of sensitivity; the silver image is effectively removed, either by conversion to soluble form and/or conversion to silver halide; and the latent image is rendered non-spontaneously developable, and at the same time the latent image substance is sensitized so that it approaches or can even exceed the sensitivity of the non-image silver halide. The latent image is thus not destroyed, but it exists as an area of increased sensitivity. This area proximates the dye image, and the increase in sensitivity thereof will aid in compensating for the absorption of light by the dye image during the exposure to light through the separation negative incident to formation of the second color component in the emulsion. Furthermore, the generally high level of sensitivity maintained in the emulsion layer produces latent conditions within the emulsion which make possible preparation of the emulsion layer after formation of the second color component for reception of a perfectly balanced third color component image.

The oxidizing agent used in the preparation of my new oxidizing rehalogenating solution can be any of the oxidizing agents known to be useful in the photographic art and containing cupric ion, ferric ion and ferricyanide ion, such as cupric halides, e. g. cupric bromide and cupric chloride; cupric sulfate; cupric nitrate; ferric chloride; ferric bromide; ferric sulfate; ferric ammonium citrate; alkali metal ferricyanides e. g. sodium or potassium ferri-

cyanide; ammonium ferricyanide; and the like. Generically, the oxidizing agents can be described as those oxidizing agents which are substantially inactive with respect to the dyes in color component images. I prefer to use an alkali metal or ammonium ferricyanide. The concentration of combined halogen which is used ranges upward from about 5 molar to saturation; and can be furnished by the use of alkali metal halides, ammonium halides and the like. The halogens which I can use in my sensitizing rehalogenation treatment are chlorine and bromine; and when I refer to the concentration of combined halogen, I do not mean that all of the halogen exists in the ionized state, but rather I intend to refer to the theoretical or calculated amount of all combined halogen which is present. The presence of ammonium ion in the solution enhances the sensitivity of the latent image substance. For optimum results with the emulsions specifically described herein, an amount of ammonium ion sufficient to produce a concentration of about 1 molar is preferred, and this is most conveniently provided by the use of an ammonium halide. The remainder of the combined halogen can be furnished by the use of alkali metal halides. Smaller amounts of ammonium ion can be used if somewhat less sensitization is desired or to obtain special effects; while larger amounts, up to the point where all of the halogen present is supplied by ammonium halide, are operative.

The new sensitizing rehalogenation solution can be used with any silver halide emulsion which is used in processes of the type involved. Surprisingly, however, and contrary to the teachings of the prior art, it is unnecessary to provide in the solution the same halogen which is present in the emulsion. Thus, an emulsion containing substantially pure silver bromide, such as Eastman 35 mm. safety release positive type 5302, can be successfully treated by the process of my invention using no soluble bromides in the sensitizing rehalogenating bath. Likewise, if chloro-bromide emulsions are used, adjustment of the components of the novel rehalogenating solution to include both halides is unnecessary for successful results. Any suitable base, whether transparent or opaque, can be employed with my new high-concentration sensitizing rehalogenation solution; e. g., paper, plastic film base, glass and the like.

A noteworthy feature of my sensitizing rehalogenation is the characteristic that it does not destroy residual latent image. An actual latent image substance remains in the emulsion layer, in the form of latent image substance which has been differentially sensitized while simultaneously being rendered non-spontaneously developable by the said sensitizing treatment.

It is essential to the successful application of the new sensitizing rehalogenation that no further exposure of the emulsion layer to light occurs at this stage of the process of my invention. The results of exposure at this time are as follows: if, after the initial exposure and the first color-forming development in the emulsion layer, and prior to any treatment of the layer with the sensitizing rehalogenation solution, the layer should be exposed uniformly to light sufficiently to form a substantial latent image therein; and, without development of said latent image, the emulsion layer should then be treated with the novel sensitizing rehalogenation solution of my invention, only that latent image which is residual from the first color-forming development is rendered non-spontaneously developable. Latent image produced by the said uniform exposure, and which was formed subsequently to formation of the first dye image, remains spontaneously developable after treatment with the said sensitizing rehalogenation solution. Because this latent image can be developed by the action of the second color-forming developer, the non-image areas will contain overall dye fog of such magnitude as to render the resulting images commercially unacceptable after the layer is subjected to the second color-forming development operation.

A specific method of demonstrating the novel effect of my sensitizing rehalogenation treatment is the following: a latent image is formed by exposure to light of a single layer emulsion and this is developed in a black and white developer. (By using non color former in this development the effect to be described is more easily seen.) After development the emulsion is treated in a stop bath and then is treated for about 30 seconds in the novel sensitizing rehalogenation solution of my invention. The emulsion is washed for a short time and masked over an area, as for example, through the center, by placing an opaque object across it. The emulsion is then flashed uniformly to light and redeveloped in the same developer. No image will appear in that portion which was masked during the second exposure, which shows that non-spontaneous developability of the original image has been achieved. In the unmasked portions, the first developed image reappears in the same phase as its original counterpart. If the original was a positive, the second developed image will also be a positive. Thus it can be seen that, after the sensitizing treatment, the original image areas are more sensitive to light than the non-image areas.

If a conventional type of rehalogenating bath be used in the above demonstration, the second developed image in the unmasked portion is produced as a reversal of the original image. This is conclusive evidence that, with conventional rehalogenation treatment, the sensitivity of the original image areas and any latent image which was present therein was depressed, and therefore the image areas resulting from the first exposure are less sensitive than the corresponding non-image areas.

After the treatment of the emulsion with the novel sensitizing rehalogenating bath following formation of the first color component image therein, the rehalogenated emulsion is subjected to light exposure through the proper separation negative and developed to form a second color component image and corresponding silver image therein. Because of the sensitivity of the areas underlying the first color component image, the second color component image is in substantially correct color balance. At this point, the undeveloped silver halide in the emulsion has a level of sensitivity which generally is several times that which would exist if the emulsion had been uniformly exposed to light. The third color component to be formed in the emulsion will be initiated by exposure to light through the proper separation negative, and this light generally must pass through the two color component images which are present in the emulsion. Because of the light absorbing characteristics of the dye images present, and their desensitizing properties, a uniform sensitivity in the emulsion is not conducive to proper color balance, for if an average exposure is given when the third separation negative is printed the silver halide in areas which do not contain dye image will be relatively over-exposed, while that in areas containing the greatest amount of dye image will be underexposed. To correct for this condition of the emulsion, it is necessary to adjust the sensitivity of the emulsion in proportion to the light transmitting characteristics of the color component images, which are present in the various areas of the emulsion.

According to another aspect of my invention, I have found a method of effecting this correction in sensitivity which is necessary to control color balance, wherein all of the images present in the emulsion layer at this stage serve as masking and controlling agents for adjusting the sensitivity of the various areas of the emulsion.

I have found that if an emulsion containing the first and second color component images, and the silver image accompanying formation of the latter, which emulsion has been previously treated with my sensitizing rehalogenation solution, is subjected to a uniform flash exposure of a duration and intensity at least sufficient to form a latent image in the non-image portions of said

emulsion, and subsequently treated with an oxidizing rehalogenation bath, the sensitivity of the various areas of the emulsion are rendered directly dependent upon the effective optical density of the images present therein.

This results from a depression of the sensitivity of the emulsion according in degree to the amount of light reaching the silver halide in the emulsion. Thus, simply stated, in areas where no dye image exists, the sensitivity of the emulsion is lowest; in areas containing dye images, the sensitivity of the emulsion increases proportionally as the effective light absorption of the images increases. As a result, when the third color separation negative is printed, the resulting color component image has been corrected so as to place the final composite image in true color balance. I have termed this process, wherein the dye images of the first and second color components and the second silver image have been the means for correcting and controlling the areal sensitivity of the emulsion, the masking control exposure.

The masking control exposure can be effected using light of any desired color temperature, especially where a relatively color blind emulsion is employed. In this case, the effective color temperature of the light used for the masking control exposure can depart radically from that of the light used for printing the separation negatives. However, since no ordinary emulsion is truly monochromatic, it follows that the color quality of the light sources for the masking control exposure and the printing exposure should be substantially the same for the best results. By varying the color quality of the light employed for these two exposures, varying effects on color balance can be obtained, if desired, to produce special or unusual results, as will be apparent to the art.

The minimum masking control exposure to be used is that intensity and duration of light which will produce at least a latent image in the non-image areas of the emulsion. The exposure can be increased to provide greater degrees of correction of the final color balance, up to the full exposure of all sensitive silver halide. Thus in special instances a masking control exposure of sufficient amount to completely expose all remaining light sensitive materials in the layer can be employed. Since two properly balanced color component images have already been produced in the layer previously to any masking control exposure, it is practical to do this, since only one of the color component images will be affected thereby.

Alternatively, instead of subjecting the emulsion to the action of an oxidizing rehalogenation bath without development of latent image formed by the masking control exposure, the latent image formed by considerably less masking control exposure can be developed in a conventional developer. The silver image formed from the said development can then be rehalogenated in the same manner as heretofore described for latent image resulting from the masking control exposure without development. A similar degree of correction of sensitivity can also be achieved in this manner. It is important to note that, in either method, the said rehalogenation treatment can be successfully effected without the need to employ a soluble halide having the same halogen element as that of the original emulsion. The rehalogenating bath which is employed following the masking control exposure can be practically any of the oxidizing rehalogenation solutions heretofore known to the art, as, for example, those described in the heretofore mentioned United States patent granted to Ryan et al. The time of treatment in these solutions is not critical.

The novel process of my invention can be employed with any of the commercially available photographic films and papers commonly employed for making positive prints, such as copy film, release positive film, chloride paper, chloro-bromide paper and the like, as well as negative films and the like.

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Illustrative examples of the novel sensitising rehalogenation solution of my invention are as follows:

Example 1

A solution is prepared having the following composition:

Potassium ferricyanide	g--	20
Ammonium chloride	g--	85
Water	cc--	250

Immersion of a previously exposed and developed emulsion in this solution for about 30 seconds at about 68° F. will accomplish rehalogenation with enhanced sensitivity of the latent image areas.

Example 2

A solution is prepared as follows:

Potassium ferricyanide	g--	20
Ammonium bromide	g--	90
Ammonium chloride	g--	40
Water	cc--	250

The desirable results described herein are obtained by using the solution in the same manner as set forth in Example 1.

Example 3

A solution is prepared which contains:

Potassium ferricyanide	g--	20
Ammonium chloride	g--	14
Potassium chloridre	g--	80
Water	cc--	250

An emulsion having present therein a silver image from previous exposure and development is rehalogenated by immersion in this solution for about 30 seconds at 68° F.

Suitable solutions for oxidizing and rehalogenating the emulsion after the masking control exposure discovered by me are illustrated by the following:

Example 4

A solution is prepared consisting of the following ingredients:

Potassium ferricyanide	g--	5.0
Sodium carbonate	g--	5.0
Potassium chloride	g--	10.0
Water	cc--	250

Rehalogenation is completed after immersion of the emulsion in this solution for about 5 minutes at 68° F.

Example 5

A solution is prepared consisting of the following ingredients:

Potassium ferricyanide	g--	5.0
Sodium carbonate	g--	5.0
Potassium bromide	g--	10.0
Water	cc--	250

Rehalogenation is completed by five minutes' immersion as in Example 4, but some overall loss of sensitivity may occur.

Example 6

A solution of the following is prepared:

Potassium ferricyanide	g--	20.0
Sodium carbonate	g--	12.5
Potassium chloride	g--	10.0
Water	cc--	250

Immersion of the emulsion for five minutes in this solution effectively completes oxidation and rehalogenation.

The following specific example sets forth the complete process for the production of a three-color print on a chloro-bromide photographic printing paper.

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The paper employed in the process described is a commercially available, chloro-bromide projection printing paper of moderate sensitivity which is sold under the trade-name Kodak Resisto Rapid N.

Example 7

- (1) Expose emulsion to red filter negative.
- (2) Develop for 3 minutes in

Sodium carbonate	g--	1.0
Sodium sulfite	g--	.25
Potassium bromide (10% solution)	drops--	3
2-4-dichloro-1-naphthol	g--	0.1
Acetone	cc--	5.0
2 - amino - 5 - diethylaminotoluene monohydrochloride	g--	0.15
Water	cc--	250.0

- (3) Treat for 1 minute in

Sodium carbonate	g--	1.0
Paraformaldehyde	g--	1.25
Water	cc--	250.0

- (4) Wash in running water for 3 minutes.
- (5) Treat 30 seconds in

Potassium ferricyanide	g--	20.0
Ammonium chloride	g--	85.0
Water	cc--	250.0

- (6) Wash 3 minutes in running water.
- (7) Dry.

- (8) Register and expose to the green filter negative.
- (9) Develop for 3 minutes in

Sodium carbonate	g--	1.75
Sodium sulphite	g--	0.15
Potassium bromide (10% solution)	drops--	3
P - nitrophenylacetoneitrile	g--	0.05
Acetone	cc--	5.0
P-aminodiethylaniline monohydrochloride	g--	0.1
Water	cc--	250.0

- (10) Repeat step #3.

- (11) Repeat step #4.

(12) Subject the emulsion, containing the cyan color-component image and the magenta color-component image and its associated silver image, to an exposure of 3 seconds to a 100 watt Mazda lamp placed at a distance of six feet, as a masking control exposure.

- (13) Treat the layer for 5 minutes in

Potassium ferricyanide	g--	5.0
Sodium carbonate	g--	5.0
Potassium chloride	g--	10.0
Water	cc--	250.0

- (14) Wash 3 minutes in running water.

- (15) Dry.

- (16) Register and expose to the blue filter negative.

- (17) Develop for 3½ minutes in

Sodium carbonate	g--	3.0
Sodium sulphite	g--	0.25
Potassium bromide (10% solution)	drops--	5.0
P-aminodiethylaniline monohydrochloride	g--	0.15
Acetoacetanilide	g--	0.15
Acetone	cc--	5.0
Water	cc--	250.0

- (18) Repeat step #3.

- (19) Repeat step #4.

(20) Remove silver and silver halides in a manner which does not injure the dyes in the multicolor image.

- (21) Wash thoroughly in running water.

- (22) Dry.

The following specific example illustrates production of a multicolor image on the aforementioned Eastman 35

mm. safety release motion picture positive film type 5302.
a substantially pure bromide emulsion:

Example 8

- (1) Expose to red filter negative.
- (2) Develop for 4 minutes in

Sodium carbonate-----g--	1.5
Sodium sulphite-----g--	.25
Potassium bromide (10% solution)-----drops--	10.0
2 - amino - 5 - diethylaminotoluene monohydrochloride -----g--	0.15
Cyan color-coupler solution ¹ -----cc--	8.0
Water -----cc--	250.0

¹ The cyan color former is:

2,4-dichloro-1-naphthol-----g--	1.0
Acetone -----cc--	45.0

- (3) Treat for 1½ minutes in

Sodium carbonate-----g--	0.5
Paraformaldehyde -----g--	1.25
Water -----cc--	250.0

- (4) Wash 5 minutes in running water.
- (5) Treat for 30 seconds in

Potassium ferricyanide-----g--	20.0
Ammonium chloride-----g--	85.0
Water -----cc--	250.0

- (6) Wash for 3 minutes in running water.
- (7) Dry.
- (8) Register and expose to the green filter negative.
- (9) Develop for 3½ minutes in

Sodium carbonate-----g--	3.5
Sodium sulphite-----g--	.25
Potassium bromide (10% solution)-----drops--	5.0
2 - amino - 5 - diethylaminotoluene monohydrochloride -----g--	0.15
Magenta color former ¹ -----cc--	5.0
Water -----cc--	250.0

¹ Magenta color former is:

P-nitrophenylacetanitrile-----g--	0.35
Acetone -----cc--	45.0

- (10) Repeat step #3.
- (11) Repeat step #4.
- (12) Subject the layer to an expose of 30 seconds to a 100 watt Mazda lamp at a distance of 12 inches, for the masking control exposure.
- (13) Treat the layer for 5 minutes in

Potassium ferricyanide-----g--	20.0
Sodium carbonate-----g--	12.5
Potassium chloride-----g--	10.0
Water -----cc--	250.0

- (14) Wash for 3 minutes in running water.
- (15) Dry.
- (16) Register and expose to blue filter negative.
- (17) Develop for 5 minutes in

Sodium carbonate-----g--	3.5
Sodium sulphite-----g--	0.25
Potassium bromide (10% solution)-----drops--	5.0
P-aminodiethylaniline monohydrochloride-----g--	0.2
Yellow color former ¹ -----cc--	10.0
Water -----cc--	250.0

¹ Yellow color former is:

O-chloroacetanilide-----g--	1.5
Acetone -----cc--	45.0

- (18) Repeat step #3.
- (19) Repeat step #4.
- (20) At this point the silver and silver halides may be removed by one of several known means which is not harmful to the multicolor image, or one or more additional images may be formed in the layer such, for example, as a conventional silver photographic sound track. After the last desired image is produced and all unwanted silver and silver halides have been removed from the

layer, the film is washed thoroughly in running water and dried.

As will be apparent to the art, the disclosures herein set forth can obviously be employed for numerous other purposes than those which have been specifically described, and it will be apparent that black and white images can be successfully reversed by the employment of the foregoing techniques. Unusual montage effects and other partial exposure types of trick photography can be successfully controlled and facilitated through application of the principles of the invention. Furthermore, corrective colored masks suitable for intermediate matrices in processes of color image reproduction can be made using my invention. All of these and other adaptations not specifically mentioned but which are self-evident to those skilled in the art are intended to be an integral part of the foregoing disclosure, and the examples are intended to be illustrative only, and not limiting.

The invention claimed is:

1. A process of color photography which comprises exposing an emulsion layer containing at least one light-sensitive silver halide of the class consisting of silver chloride and silver bromide and forming therein a first latent image representative of a color component of a multicolor image; developing at least a portion of said latent image with a color-forming developer which forms a first dye image and a silver image in said layer; rehalogenating said silver image with an oxidizing rehalogenation bath containing in aqueous solution an effective amount of an oxidizing agent which is substantially inactive with respect to the said dye image, and at least one combined halogen selected from the group consisting of chlorine and bromine in concentration at least about 5 molar, at least about one-fifth of which halogen is supplied by an ammonium halide, the remainder of said halogen being supplied by an alkali metal halide, whereby said silver image is rehalogenated and latent image is rendered non-spontaneously developable, said rehalogenated silver and said latent image being rendered substantially as light-sensitive as the theretofore unexposed areas of the said emulsion layer; forming in the said emulsion layer in register with said dye image at least one other latent image representative of another color component of said multicolor image and developing the resulting latent image with a color-forming developer which forms in said emulsion layer a silver image and a dye image having a color different from that of said first-formed dye image; and when multicolor image formation is concluded removing substantially all silver and silver salts from said emulsion layer.

2. A process of color photography which comprises exposing an emulsion layer containing at least one light-sensitive silver halide of the class consisting of silver chloride and silver bromide and forming therein a latent image representative of a first color component of a multicolor image; developing at least a portion of said latent image with a color-forming developer which forms a first color component dye image and a silver image in said layer; rehalogenating said silver image with an oxidizing rehalogenating solution containing in aqueous solution an effective amount of an oxidizing agent which is substantially inactive with respect to the said dye image, and at least one combined halogen selected from the group consisting of chlorine and bromine, in concentration of at least about five molar, at least about one-fifth of said halogen being supplied by an ammonium halide, the remainder of said halogen being supplied by an alkali metal halide, whereby said silver image is rehalogenated and latent image is rendered non-spontaneously developable, said rehalogenated silver and said latent image being rendered substantially as light-sensitive as the theretofore unexposed areas of the said emulsion; forming in the emulsion layer, in register with said dye image, a second latent image representative of a second color component of said multicolor image; developing said second latent

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image with a color-forming developer which forms in said emulsion a silver image and a second color component dye image; exposing said emulsion containing said first and second color component images to light for a period of time sufficient to form at least a latent image in the non-image portions of said emulsion; rehalogenating said emulsion with an oxidizing rehalogenating bath containing an oxidizing agent which is substantially inactive with respect to color component image dye, and a soluble halide, which are together capable of destroying latent image, reducing the sensitivity of exposed silver halide and forming silver halide from developed silver, whereby the sensitivity of the various areas of the emulsion is rendered directly dependent upon the effective optical density of color component images present therein; forming in the said emulsion layer in register with said first and second color component dye images a latent image representative of a third color component of said multicolor image; developing said latent image with a color-forming developer which forms in said emulsion a silver image and a third color component dye image; and removing substantially all silver and silver salts from said emulsion layer.

3. The process according to claim 2, wherein the combined halogen in the oxidizing rehalogenation solution employed to effect rehalogenation of the first silver image formed in the emulsion layer is substantially all supplied by an ammonium halide.

4. The process according to claim 2, wherein the com-

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bined halogen in the oxidizing rehalogenation solution employed to effect rehalogenation of the first silver image formed in the emulsion layer is substantially all supplied by ammonium chloride.

5. The process according to claim 2, wherein the combined halogen in the oxidizing rehalogenation solution employed to effect rehalogenation of the first silver image formed in the emulsion layer is substantially all supplied by ammonium bromide.

6. The process according to claim 2, wherein the combined halogen in the oxidizing rehalogenation solution employed to effect rehalogenation of the first silver image formed in the emulsion layer is supplied by a major amount of an alkali metal halide and a minor amount, not less than about 20%, of ammonium chloride.

7. The process according to claim 2, wherein the combined halogen in the oxidizing rehalogenation solution employed to effect rehalogenation of the first silver image formed in the emulsion is supplied by a major amount of potassium chloride and a minor amount, not less than about 20%, of ammonium chloride.

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