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COMPLETE SPECIFICATION

Reversal Processing of Photographic Colour Materials and Developer Compositions for use therein

We, EASTMAN KODAK COMPANY, a Company organized under the Laws of the State of New Jersey, United States of America, 343 State Street, Rochester 4, New York, United States of America, (CHARLETON CORDERY BARD and DEANE STANLEY THOMAS) do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to photography, more particularly to the reversal processing of photographic colour materials and to developer compositions for use therein.

In the sensitive multi-layer photographic material used in colour photography, there are usually three selectively sensitive emulsion layers coated on one side of a photographic support. For example, the uppermost layer may be blue-sensitive, the next layer a yellow filter, the next layer green-sensitive, and the emulsion layer adjacent to the support red-sensitive. The yellow filter layer located between the blue- and green-sensitive layers serves to absorb the blue radiation which may be transmitted through the blue-sensitive layer to the underlying layers, which are sensitive in the blue region of the spectrum, in addition to the red or green region of the spectrum. Sometimes such multi-layer photographic materials contain additional silver halide emulsion layers or other interlayers for specialized purposes. In photographic print materials, frequently the yellow filter layer is omitted and the arrangement of silver halide emulsion layers may be changed for the purpose of obtaining more accurate recording of the colour negative. Multi-layer materials of the type which can be used in the present invention have been previously described in the prior art, such as Specification No. 507,841.

The present invention is concerned with the reversal processing of colour materials, in

which the exposed material is given a conventional black-and-white negative development, followed by a reversal exposure, or exposures, and finally colour development and in which aldehydes are produced in or introduced into the emulsion layers at some stage. The colour materials which may be employed in the invention include those having a silver halide emulsion containing the colour-forming substances or couplers in the emulsion, as well as colour materials which are intended for processing in a colour developer containing colour couplers.

One way in which aldehydes are produced in the layers is the processing of photographic colour materials by a reversal technique in which the colour couplers are incorporated in the colour developers, and when a balancing developing agent (as defined below) may be incorporated in one or more of the colour developers. This practice is particularly useful with the cyan colour developer. Such balancing developers serve two functions, in general. First, they act as antioxidants and frequently react with oxidized colour developer through a cross-oxidation reaction, which regenerates the desired colour developer. Secondly, the balancing developing agents react directly with the exposed silver halide as an auxiliary developer. The practical advantages of incorporating these balancing developing agents in the cyan colour developer are (1) improved red characteristic curve, (2) increased red speed, (3) increased overall red contrast and (4) no appreciable reduction of the inherent high definition of the cyan colour developer.

However, these balancing developing agents do have adverse effects in the reversal colour developers customarily employed, in that they can react with oxidised colour developing agent whereby a Schiff's base is generated which undergoes rather rapid hydrolysis in the strongly alkaline colour developers to pro-

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duce free aldehyde. While some reduction of the silver halide by the balancing developer may be an advantage in certain colour processes where it is desired to reduce completely all the exposed silver halide, so that no unexposed silver halide remains in one emulsion layer before proceeding with exposure and development of another emulsion layer, the formation of Schiff's bases in colour developers is particularly objectionable, since such Schiff's bases are so easily hydrolysed to free aldehydes. These free aldehydes tend to react with some of the colour developing agent, which causes the formation of objectionable impurities in the colour developer.

Another way in which aldehydes may be introduced into the layers is when an exposed colour material is subjected to a prebath before development (colour or black-and-white) which contains an aldehyde hardener such as formaldehyde or succinaldehyde. Even where the photographic material has been given a washing treatment between the prebath and the developer, it is usually not possible to remove sufficient aldehyde to avoid many of the adverse photographic effects resulting from the use of the aldehyde hardener in the prebath. The free aldehyde has a particularly undesirable effect in the development of the colour image in that it spontaneously reacts with the coupler (e.g., magenta or yellow) by an irreversible reaction, thereby causing a loss of colour density.

The present invention is based on the discovery that if at least one of the colour developing steps is carried out in the presence of an amine compound as defined below, the deleterious effects arising from the presence of aldehyde in the material are largely avoided.

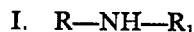
According to the present invention, there is provided a photographic developer composition for use in colour photography which comprises an aqueous alkaline solution of an aromatic primary amino developing agent containing, in addition to the primary amino group, a hydroxyl or another amino group, a balancing developing agent (as defined below), and an amine compound containing a —NH_2 group having attached thereto a —NHCO— , —CONH— , —NH—C(=NH)— , —OH or —NH_2 group.

The present invention also provides a process of producing a reversed three-colour image by exposing to a subject a sensitive colour photographic material comprising a support bearing on one side thereof three differentially colour sensitive silver halide emulsion layers, none or at most one of the layers containing a colour coupler, treating the exposed material with a black-and-white developer to develop negative silver images in the three layers, rendering the residual silver halide in each layer in turn developable by chemical or light fogging and colour developing the developable silver halide in each layer

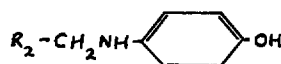
to a silver-plus-dye image, and, when all three layers have been colour developed, removing all silver from the emulsion layers to leave a three-colour reversal image in the material, at least one of the colour developing solutions comprising an aromatic primary amino developing agent containing in addition to the primary amino group, a hydroxyl or another amino group, a balancing developing agent (as herein defined) and an amine compound containing a —NH_2 group having attached thereto a —NHCO— , —CONH— , —NH—C(=NH)— , —OH or —NH_2 group.

Another embodiment of the invention consists of a process of producing a reversal three-colour image by exposing to a subject a sensitive colour photographic material comprising a support bearing on one side thereof three differentially colour sensitive silver halide emulsions, treating the exposed material with a black-and-white developer to develop negative silver images in the three layers, rendering the residual silver halide in each layer developable by chemical or light fogging and colour developing the developable silver halide in each layer to a silver-plus-dye image, and, when all three layers have been colour developed, removing all silver from the emulsion layers to leave a three-colour image in the material, the process including the step of ~~treating~~ treating the exposed material, at a stage before at least one of the developing treatments thereof, with an aldehyde hardening bath, at least one of the developing treatments after such hardening treatment being carried out by employing a developing solution containing an amine compound containing a NH_2 group having attached thereto a —NHCO— , —CONH— , —NH—C(=NH)— , —OH or —NH_2 group.

The balancing developing agents which may be employed in the present invention, and which have the objectionable property of forming Schiff's bases, are defined by the following general formula:



wherein R represents an aralkyl group, such as benzyl, which may or may not contain additional substituents, such as hydroxyl, amino, nitro, chloro, bromo and alkyl (e.g. methyl or ethyl), and R_1 represents a *p*-hydroxyphenyl group which can be further substituted by alkyl groups having 1 to 4 carbon atoms, such as methyl and ethyl. Preferred balancing developing agents are represented by the following general formula:



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wherein R_2 represents a monocyclic aryl group of the benzene series, such as phenyl, hydroxyphenyl, chlorophenyl, aminophenyl, sulphonyphenyl (including alkali metal salts thereof, such as sodium and potassium), tolyl and ethylphenyl.

It has been found that the undesirable effects of these balancing developing agents in colour developers can be largely or entirely overcome, without adversely affecting their desirable properties, by including in the colour developer an amine compound as defined above. Typical amine compounds, which can be used in the form of their free base, or more conveniently in the form of their acid addition salts (e.g. hydrochloride, sulphate and phosphate) are semicarbazide, hydrazine, carbohydrazide and hydroxylamine. These compounds and others which can be used in the present invention, can be represented by the following formulas:

1. H_2N-OH

hydroxylamine



2. $H_2NNHCNH_2$

semicarbazide

3. H_2NNH_2

hydrazine



4. $H_2NNHCNHNH_2$

carbohydrazide



5. $H_2NCNHCNH_2$

biuret



6. $H_2NNHCNH_2$

aminoguanidine



7. $H_2NNHCNHCH_3$

methylsemicarbazide



8. $[(CH_3)_3N^+CH_2C(=O)NHNH_2]Cl^-$

Girard's reagent

Amine compounds which are particularly useful in the invention are those which have little or no reducing action toward silver halide of their own, such as semicarbazide and carbohydrazide.

These amine compounds can be utilized in various concentrations, depending upon the concentration of balancing developer used, the concentration of colour developer, and so on. In general, we have found that a concentration of from 0.1 to 5.0 grams per litre of amine compound is satisfactory for the purposes of the present invention. It is apparent that smaller amounts of amine compound should be used in those cases where the amine has some undesired developing or solvent action of its

own toward silver halide, such as in the case for hydrazine and its salts. In the case of those amine compounds which have little or no developing or solvent action of their own toward silver halide, larger amounts can be tolerated without having any adverse effects upon the colour development. The most advantageous concentration can be determined by developing a series of test strips of silver halide emulsions wherein the concentration of the amine compound, as well as the concentration of the developing agent, is varied. The usual addenda may be present in the developers, such as strongly alkaline agents (e.g. sodium carbonate, potassium carbonate or sodium hydroxide), restraining agents, such as potassium bromide or iodide, stain preventatives and antioxidants, such as alkali metal sulphites.

The sensitive material which may be developed by the composition of the present invention may include the ordinarily employed gelatino-silver halide developing-out emulsions, e.g., gelatino-silver-chloride, -chlorobromide, -chloriodide, -chlorobromiodide, -bromide and -bromiodide developing-out emulsions. While the results in the following examples were obtained using gelatino-silver-bromiodide emulsions, excellent results can also be obtained using other silver halide emulsions. These emulsions can be coated in the usual manner on any suitable support, e.g., glass, cellulose nitrate film, cellulose ester film, polyvinyl acetal resin film, paper or metal.

The photographic silver halide emulsions may contain such addenda as chemical sensitizers, e.g. sulphur sensitizers (e.g., allyl thiocarbamide, thiourea, allyl isothiocyanate and cystine), various gold compounds (e.g. potassium chloraurate and auric trichloride) (see specifications Nos. 658,826, 680,593 and 682,355), various azaindene compounds (such as those disclosed in Specification No. 748,745), condensation products of alkylene oxides, such as those shown in Specification No. 592,676, as well as the additives mentioned in Specifications Nos. 861,194 and 871,801.

The present invention is particularly useful in reversal colour photographic processes wherein the colour-forming couplers are incorporated in the colour developing baths. The invention may however also be used in any reversal colour process wherein a colour material has been given an aldehyde hardening treatment in a bath prior to development (colour or black-and-white) so that the development can be performed at a higher temperature and in a shorter period of time. In this case, the colour coupler may be present in the sensitive emulsion or in the developer. According to the present invention, one of the above-identified amine compounds can be incorporated in the black-and-white or colour negative developer following

the hardening treatment to avoid the undesirable effects of the free aldehyde.

The pH of the developers used in the present invention including both the colour developers and the black-and-white negative developers, is chosen according to the particular material which is to be processed therein. In the case of colour developers, it has been found that particularly useful results can be obtained where the pH is relatively high, i.e., at least 10.0 and preferably about 11.5. In some cases, it is desirable to employ these developers at even higher pH values, such as 12.5.

Typical colour-forming compounds or couplers which may be present in the developing compositions of the invention are described in Specifications Nos. 531,246; 531,312; 537,921; 538,914; 545,448; 562,205; 595,314; 649,660; 680,488; 791,219; 843,497; and 886,722.

Typical colour-forming compounds or couplers which may be present in the colour materials developed by the developing composition of the present invention are described in Specifications Nos. 595,314; 649,660; 660,012; 680,488; 674,161; 791,219; 800,108; and 873,198. In addition to the above couplers, couplers which are particularly useful in colour developers include couplers 1-64 of our copending Application No. 26783/58 (Serial No. 898,005). Couplers which are useful in photographic silver halide emulsion layers include couplers 65-77 of the aforesaid copending Application No. 26783/58 (Serial No. 898,005).

The colour-forming developing agents which are useful in the invention are aromatic primary amines containing an amino (substituted or not) or hydroxyl substituent. Phenylenediamines and substituted derivatives thereof containing a primary amino group have been found to provide excellent results when employed in combination with a balancing developing agent and at least one amine of the

type indicated above. Typical of such colour-forming developing agents are the sulphon-amido-substituted *p*-phenylenediamines disclosed in Specification No. 651,749, the substituted *p*-phenylenediamines disclosed in

Specification No. 653,284. The first developer, i.e. black-and-white negative developer, employed in the colour reversal process of the invention is generally a rapid developer of the MQ type, i.e., a combination of hydroquinone and metol developer (*p* - N - methylaminophenol). Other black-and-white developers, such as hydroquinone alone, pyrazolidone developers (e.g. 1-phenyl-3-pyrazolidone and 4,4-dimethyl-1-phenyl-3-pyrazolidone, etc.) can be used, if desired.

The photographic silver halide emulsions useful in the process of our invention can be prepared according to known methods, such as those disclosed in Specification No. 655,082. Of course, emulsions prepared by other methods can also be used in the invention.

The following example shows how the effect of employing an amine compound according to the invention may be tested, and employs a sensitive material containing a single sensitive emulsion layer which is subjected to reversal cyan colour development of the type employed in the processing of reversal colour material not containing colour couplers.

EXAMPLE 1

A portion of a gelatino-silver-bromide emulsion which had been sensitised with a sulphur compound and a gold salt as mentioned above, was coated on a cellulose acetate support. The coating was then dried and cut into several strips. One strip of each coating was then exposed for 1/25 second to a 500-watt, 3000°K. light source on an Eastman Type Ib sensitometer. One of the exposed strips was then developer for 3 minutes in a black-and-white developer having the following composition:

Sodium hexametaphosphate	0.5	gram
Sodium sulphite (anhydrous)	40.0	grams
N-methyl- <i>p</i> -aminophenolsulphate	5.0	"
Hydroquinone	2.0	"
Sodium carbonate (monohydrate)	25.0	"
Potassium bromide	1.0	gram
Potassium iodide (0.1% by weight solution)	2	ccs.
Water to make one litre (pH was 10.1 at 70°F.)		

The strip was then washed for 2 minutes.

COLOUR DEVELOPMENT

The above strip was then given a reversal exposure for about 10 seconds (flash) with a

No. 2 Photoflood set at about 60 inches. The strip was then developed to an adequate D-max. (time=5 minutes) in a developer having the following formula:



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W20



Sulphuric acid (conc.)	1.0 cc.
Sodium hexametaphosphate	0.5 gram
Sodium sulphite (anhydrous)	5.0 grams
Colour developer *	0.6 gram
N-benzylaminophenol <i>a</i>	0.40 "
Sodium carbamate (nonohydrate)	15.0 grams
Potassium bromide	0.25 gram
Potassium iodide (0.1% by weight solution)	2 ccs.
Coupler**	1.2 gram
Sodium hydroxide	0.3 gram
Water to make one litre	

* 4-amino-3-methyl-N,N-diethylaniline hydrochloride

** 2,4-dichloro-5-(*p*-toluenesulphonamido)-1-naphthol

a as hydrochloride

manohydrate

The strip was then washed for about 10 minutes in a silver bleach bath having the minutes in water and treated for about 2 following composition:

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Potassium ferricyanide	100 grams
Potassium bromide	10 "
Borax	7.5 "
Boric acid	5.0 "
Water to make one litre	

The strip was then treated for about 2 minutes in a fixing bath having the composition given below, washed and dried.

Sodium thiosulphate (pentahydrate)	200 grams
Sodium sulphite (anhydrous)	10 "
Water to make one litre	

- 10 In order to determine the effect of the amine aldehyde scavengers, additional strips of emulsion were processed exactly as described above, except that one of the amine compounds, as identified below, in the quantity given, was added to the colour developer. The effect of the aldehyde scavenger at the concentration given is shown in the following table: 15

TABLE

Compound No. (See list above)	Conc. gram/litre	Effect
Control	None	Distinct aldehyde odour
1 (as sulphate)	0.25	No aldehyde odour
2	4.7	No aldehyde odour
3 (as sulphate)	0.25	No aldehyde odour
4	3.2	No aldehyde odour

The above example describes how the amine compounds of the invention may be used in cyan colour development, but they may also be employed to advantage in magenta or yellow developers containing appropriate couplers. For example, Compound 1 can be employed in colour developers containing a coupler for the magenta image, such as Coupler No. 45 of Application No. 26783/58 (Serial No. 898,005).

The next example shows how the amine

compounds may be used in the processing of an exposed three-colour reversal photographic material.

EXAMPLE 2

A multi-layer photographic element of the type described in Specification No. 507,841, was exposed to an original multi-coloured image and developed for about 3½ minutes at 80°F. in a black-and-white developer having the following composition:

Quadrofos*	0.6 gram
Sodium sulphite (anhydrous)	12.0 grams
p-N-methylaminophenol sulphate	5.0 gram
Sodium hydroxide	1.0 "
Hydroquinone	2.0 grams
Sodium sulphate (anhydrous)	6.0 "
Sodium carbonate (anhydrous)	35.0 "
Potassium iodide (0.1% by weight solution)	10.0 mls.
Sodium bromide	3.0 grams
Sodium thiocyanate	1.75 "
Water to one litre	

* Sodium tetraphosphate (or hexametaphosphate)

The photographic material was then spray washed with water for about ½ minute and given an exposure to red illumination of 1100 ft. candle seconds. The exposed material was then developed in a cyan developer having the following formula:

Carbohydrazide	3.2 grams
Quadrofos*	0.7 gram
Sodium bromide	2.50 grams
Potassium iodide (0.1% by weight solution)	5.0 mls.
Sodium sulphite (anhydrous)	10.0 grams
Sodium sulphate (anhydrous)	20.0 "
Sodium hydroxide	3.30 "
6-Nitrobenzimidazole (1% by weight solution, 1% by weight sodium Hydroxide)	5.0 mls
p-N-benzylaminophenol a	0.70 gram
Coupler**	1.50 "
4-Amino-N,N-diethyl-3-methylaniline hydrochloride	
Water to one litre	2.60 grams

* sodium tetraphosphate

** 2-(o-acetamido-β-phenylethyl)-1-hydroxy-naphthamide
a as hydrochloride

Similar results could be obtained by using, in place of the carbohydrazide, 4.7 grams/litre of semicarbazide, 0.25 gram/litre of hydroxylamine sulphate or 0.25 gram/litre of hydrazine sulphate.

The photographic material was then washed for about ½ minute with water and exposed to blue light of 300 ft. candle seconds intensity and developed in a yellow colour developer containing a phenylenediamine colour-developing agent, such as 4-amino-N,N-diethyl-

aniline hydrochloride and a yellow coupler, such as Coupler No. 47 from Specification No. 26783/58 (Serial No. 898,005). The photographic material was then washed and fogged chemically by treatment with a sodium borohydride solution, as described in copending Application No. 38748/58 (Serial No. 904,472). The photographic material was then developed in a magenta colour developer containing a colour developing agent, such as 4-amino-N,N-diethyl-3-methylaniline hydro-

chloride and a magenta coupler, such as Coupler No. 30 of Application No. 26783/58 (Serial No. 898,005).

- 5 As indicated above, the amine compounds of the invention are also useful when incorporated into the first or negative developer in a reversal colour process when the exposed material has been subjected to a prebath containing an aldehyde hardener. While the first
10 developer produces a black-and-white image,

the function of the amine compound is the same as in the colour developers of the invention in that it acts as a scavenger of any aldehyde which carries over into the first developer from the prebath containing an aliphatic aldehyde, such as formaldehyde or succinaldehyde. A typical first developer for use in a reversal colour process which can be used in the invention is as follows:

15

Quadrofos*	2.0	grams
p-N-methylaminophenol sulphate	5.0	"
Sodium sulphite (anhydrous)	42.2	"
Hydroquinone	5.2	"
Sodium carbonate (anhydrous)	28.2	"
Sodium thiocyanate	1.38	"
Potassium iodide	0.005	"
Sodium bromide	1.7	"
Sodium bisulphite	1.5	"
Hydroxylamine sulphate	5.0	"
Water to 1 litre		
pH at 80°F. 9.80		

* sodium tetraphosphate (or hexametaphosphate)

- Instead of hydroxylamine sulphate, other amine compounds of the invention, such as carbohydrazide, 1.0 gram/litre, or any of the other above-identified amines can be used.
25 Since a black-and-white image is produced in the first developer, it is obvious that the amount of amine stabilizer used is not nearly as important as in the case of the colour developers.

30 WHAT WE CLAIM IS:—

1. A process of producing a reversal three-colour image by exposing to a subject a sensitive colour photographic material comprising a support bearing on one side thereof
35 three differentially colour sensitive silver halide emulsion layers, none or at most one of the layers containing a colour coupler, treating the exposed material with a black-and-white developer to develop negative silver images in the three layers, rendering the residual silver
40 halide in each layer in turn developable by chemical or light fogging and colour developing the developable silver halide in each layer to a silver-plus-dye image, and, when all three layers have been colour developed, removing
45 all silver from the emulsion layers to leave a three-colour image in the material, at least one of the colour developing solutions comprising an aromatic primary amino developing agent containing, in addition to the primary amino
50 group, a hydroxyl or another amino group, a balancing developing agent (as defined herein), and an amine compound containing a —NH_2 group having attached thereto a —NHCO— ,
55 —CONH— , —NH—C(=NH)— , —OH or —NH_2 group.

2. A process of producing a reversal three-colour image by exposing to a subject a sensitive colour photographic material comprising a support bearing on one side thereof three differentially colour sensitive silver halide emulsions, treating the exposed material with a black-and-white developer to develop negative silver images in the three layers, rendering the residual silver halide in each layer developable by chemical or light fogging and colour developing the developable silver halide in each layer to a silver-plus-dye image, and, when all three layers have been colour developed, removing all silver from the emulsion layers to leave a three-colour image in the material, the process including the step of treating the exposed material, at a stage before at least one of the developing treatments thereof, with an aldehyde hardening bath, at least one of the developing treatments after such hardening treatment being carried out by employing a developing solution containing an amine compound containing a —NH_2 group having attached thereto a —NHCO— , —CONH— , —NH—C(=NH)— , —OH , or —NH_2 group.

3. A process as claimed in either Claim 1 or 2, in which the amine compound is one of those listed hereinbefore.

4. A photographic developer composition for use in colour photography which comprises an aqueous alkaline solution of an aromatic primary amino developing agent containing, in addition to the primary amino group, a hydroxyl or another amino group, a balancing developing agent (as defined herein),

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chloride and a magenta coupler, such as Coupler No. 30 of Application No. 26783/58 (Serial No. 898,005).

- 5 As indicated above, the amine compounds of the invention are also useful when incorporated into the first or negative developer in a reversal colour process when the exposed material has been subjected to a prebath containing an aldehyde hardener. While the first
10 developer produces a black-and-white image,

the function of the amine compound is the same as in the colour developers of the invention in that it acts as a scavenger of any aldehyde which carries over into the first developer from the prebath containing an aliphatic aldehyde, such as formaldehyde or succinaldehyde. A typical first developer for use in a reversal colour process which can be used in the invention is as follows:

15

Quadrofos*	2.0	grams
p-N-methylaminophenol sulphate	5.0	"
Sodium sulphite (anhydrous)	42.2	"
Hydroquinone	5.2	"
Sodium carbonate (anhydrous)	28.2	"
Sodium thiocyanate	1.38	"
Potassium iodide	0.005	"
Sodium bromide	1.7	"
Sodium bisulphite	1.5	"
Hydroxylamine sulphate	5.0	"
Water to 1 litre		
pH at 80°F. 9.80		

* sodium tetraphosphate (or hexametaphosphate)

- Instead of hydroxylamine sulphate, other amine compounds of the invention, such as carbohydrazide, 1.0 gram/litre, or any of the other above-identified amines can be used.
25 Since a black-and-white image is produced in the first developer, it is obvious that the amount of amine stabilizer used is not nearly as important as in the case of the colour developers.

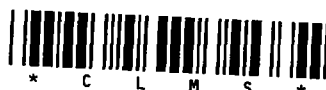
30 WHAT WE CLAIM IS:—

1. A process of producing a reversal three-colour image by exposing to a subject a sensitive colour photographic material comprising a support bearing on one side thereof
35 three differentially colour sensitive silver halide emulsion layers, none or at most one of the layers containing a colour coupler, treating the exposed material with a black-and-white developer to develop negative silver images in the
40 three layers, rendering the residual silver halide in each layer in turn developable by chemical or light fogging and colour developing the developable silver halide in each layer to a silver-plus-dye image, and, when all three
45 layers have been colour developed, removing all silver from the emulsion layers to leave a three-colour image in the material, at least one of the colour developing solutions comprising an aromatic primary amino developing agent
50 containing, in addition to the primary amino group, a hydroxyl or another amino group, a balancing developing agent (as defined herein), and an amine compound containing a —NH₂ group having attached thereto a —NHCO—,
55 —CONH—, —NH—C(=NH)—, —OH or —NH₂ group.

2. A process of producing a reversal three-colour image by exposing to a subject a sensitive colour photographic material comprising a support bearing on one side thereof three
60 differentially colour sensitive silver halide emulsions, treating the exposed material with a black-and-white developer to develop negative silver images in the three layers, rendering the residual silver halide in each layer
65 developable by chemical or light fogging and colour developing the developable silver halide in each layer to a silver-plus-dye image, and, when all three layers have been colour developed, removing all silver from the emulsion
70 layers to leave a three-colour image in the material, the process including the step of treating the exposed material, at a stage before at least one of the developing treatments thereof, with an aldehyde hardening bath, at
75 least one of the developing treatments after such hardening treatment being carried out by employing a developing solution containing an amine compound containing a —NH₂ group having attached thereto a —NHCO—,
80 —CONH—, —NH—C(=NH)—, —OH, or —NH₂ group.

3. A process as claimed in either Claim 1 or 2, in which the amine compound is one of those listed hereinbefore.

4. A photographic developer composition for use in colour photography which comprises an aqueous alkaline solution of an aromatic primary amino developing agent containing, in addition to the primary amino
90 group, a hydroxyl or another amino group, a balancing developing agent (as defined herein),

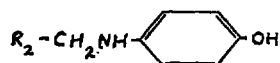


* C L M S *

and an amine compound containing a —NH_2 group having attached thereto a —NHCO— , —CONH— , —NH—C(=NH)— , —OH , or —NH_2 group.

- 5 5. A developer composition as claimed in Claim 4, in which the aromatic primary amino developing agent is an arylenediamine developing agent.

- 10 6. A developer composition as claimed in Claim 4 or 5, in which the balancing developing agent has the general formula:



wherein R_2 represents a monocyclic aryl group of the benzene series, substituted or not.

- 15 7. A developer composition as claimed in Claim 6, in which the balancing developing agent is β -N-benzylaminophenol.

8. A developer composition as claimed in any of Claims 4 to 7, in which the amine is one of the eight compounds listed herein-
before in the specification. 20

9. A developer composition as claimed in any of Claims 4 to 8, in which the amine compound is present in a concentration of from 0.1 to 5.0 grams per litre of solution. 25

10. A developer composition as claimed in any of Claims 4 to 9 having a pH of at least 10.0, preferably 11.5 or above.

11. A developer composition as claimed in any of Claims 4 to 10, also containing a yellow, cyan or magenta-forming colour coupler. 30

12. Colour photographic developer compositions according to Claim 4 substantially as herein described. 35

13. Reversal colour processes according to Claim 1 or 2 substantially as herein described.

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