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[33] **Japan**
[31] **43/42840**

[54] COMPETING COLOR DEVELOPER COMPOSITION

18 Claims, No Drawings

[52] **U.S. Cl.** **96/22,** 96/55
[51] **Int. Cl.** **G03c 7/16,** G03c 7/00
[50] **Field of Search** 96/22, 55, 59, 66

[56] **References Cited**

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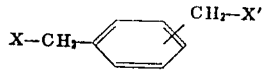
ABSTRACT: A color developer composition comprising a primary aromatic amino developing agent, a color-forming coupler, an alkali, and a water-soluble competing developing agent having the formula:

(I)



wherein X and X' each represents a p-hydroxyanilino group of which the benzene ring may further be substituted by a member selected from the class consisting of an alkyl group having from one to four carbon atoms, a hydroxyalkyl group having from one to four carbon atoms, an alkoxy group having from one to four carbon atoms and a halogen atom, and the X'–CH_2-group may be located at the o-, m- or p-position to the position of the X–CH_2-group.

An improved color reversal development of a multilayer, multicolor photographic element is also claimed, where the improvement comprises utilizing, in at least one color developer used in the process, a water-soluble competing developing agent as above described.

Further described is a composition for preparing a color developer solution comprising a primary aromatic amino developing agent and the water-soluble competing developing agent described above.

COMPETING COLOR DEVELOPER COMPOSITION

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a developer composition for color photography, and more particularly, to a color-forming developer composition containing a novel water-soluble competing developing agent.

Description of the Prior Art

In general, reversal color photographic light-sensitive elements which are to be developed in a coupler-containing developer are, after exposure, subjected to black and white development, and then, after being subjected to a reversal exposure, are processed in a color developer which contains couplers. This type of element usually has multiple emulsion layers which will include three selective light-sensitive emulsion layers.

For example, in one such photographic element, a support will carry the following layers: a lowermost red-sensitive emulsion layer, a green-sensitive emulsion layer, a yellow filter layer, a blue-sensitive emulsion layer, and an upper protective layer (formed on the support in the order given.).

A color-forming developer used for developing such a reversal color photographic light-sensitive element usually comprises: an alkaline aqueous solution containing a p-phenylenediamine-type developing agent which has at least one primary amino group; a color-forming coupler; and additives, such as an alkali metal sulfite, e.g., sodium sulfite, an alkali metal bromide, e.g. sodium bromide, an alkali metal iodide, etc. In such a color-forming developer composition, there will generally be employed a phenolic or naphtholic coupler as a cyan dye former; a pyrazolone coupler as a magenta dye-former; and an open-chain ketomethylene coupler as a yellow dye-former.

When subjecting a reversal color photographic element to cyan development using a color-forming developer containing a color former or coupler, to suppress the formation of cyan fogs in the green-sensitive and the blue-sensitive emulsion layers, a competing developing agent is incorporated into the cyan developer. N-benzyl-p-aminophenol is widely used as one such "competing developing agent." It is generally known that the competing developing agent will reduce an oxidized color developing agent to the state of the original developing agent, and will reduce an exposed silver halide into metallic silver. The competing developing agent will thus contribute to suppressing cyan contamination in the blue-sensitive emulsion layer and, in particular, in the green-sensitive emulsion layer, therefore yielding a correct red reproduction of the subject photographed. This is due to the fact that the competing developing agent and the color developing agent will both compete for reaction with the exposed silver halide.

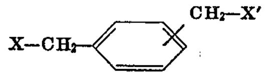
A competing developing agent which may be employed in photographic processing must be capable of increasing the red contrast by removing cyan contamination, and must be capable of also increasing the sensitivity of the red-sensitive emulsion layer. Furthermore, the competing developing agent must not reduce the maximum density of the red-sensitive emulsion layer; must not reduce the high degree of clarity of the cyan color developing agent; and must not reduce the photographic properties of the emulsion without also reducing the stability of the cyan developer.

However, to date, when a conventional color developer containing a competing developing agent for use in color reversal processing has been employed, the red contrast and the fog prevention have been insufficient. In particular, sensitivity has been greatly reduced as time passes, as well as a marked increase in fog formation, yielding unsatisfactory results. Cyan contamination in the green-sensitive emulsion layer becomes greatly increased with the use of a conventional developer, and it becomes necessary to increase the amount of developer needed, which greatly lowers the utility of the color developing process and leads to increased expense.

SUMMARY OF THE INVENTION

The present invention provides an improved color developer composition comprising a primary aromatic amino developing agent, a color-forming coupler, an alkali, and a novel water-soluble competing developing agent having the formula:

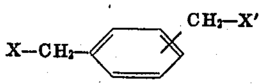
(I)



wherein X and X' each represents a p-hydroxyanilino group of which the benzene ring may further be substituted by a member selected from the class consisting of an alkyl group having from one to four carbon atoms, a hydroxyalkyl group having from one to four carbon atoms, an alkoxy group having from one to four carbon atoms and a halogen atom, and the X'–CH_2–group may be located at the 0-, m- or p-position to the position of the X–CH_2–group.

The present invention further provides a novel color reversal development process for multilayer, multicolor photographic elements which have been exposed through an original image, the element comprising a support coated with differently sensitive silver halide emulsion layers, one of said layers being red-sensitive, one of said layer being green-sensitive and one of said layers being blue-sensitive, in which the said exposed elements given a negative black and white development, selective reexposure of said red-sensitive layer with red light, treatment of said element with a cyan color developer, selective reexposure of the said blue-sensitive layer with blue light, treatment of said element with a yellow color developer, fogging the unexposed silver halide in the green sensitive layer, treating the said element with a magenta color developer, treating said developed element in a ferricyanide-bromide bleach and then in a fixing bath, to leave in said element a color reproduction of said original image. The improvement in said process specifically comprises the use, in at least one of said color developers, of a water-soluble competing developing agent having the formula:

(I)



wherein X and X' each represents a p-hydroxyanilino group of which the benzene ring may further be substituted by a member selected from the class consisting of an alkyl group having from one to four carbon atoms, a hydroxyalkyl group having from one to four carbon atoms, an alkoxy group having from one to four carbon atoms and a halogen atom, and the X'–CH_2–group may be located on the o-, m- or p-position to the position of the X–CH_2–group.

The invention further comprises a composition for preparing a color developing solution, the composition comprising a primary aromatic amino developing agent and a water-soluble competing developing agent above defined.

It is an object of the present invention to provide a developer composition which contains a novel competing developing agent which will suppress the formation of fogs in photographic emulsion layers, and most especially which will suppress the formation of cyan fogs in green-sensitive and blue-sensitive emulsion layers.

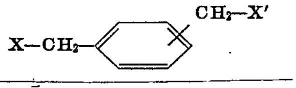
Another object is to provide a color developer composition containing a novel competing developing agent which will yield a highly pure red reproduction, and which will also increase the sensitivity of a red-sensitive emulsion layer.

Still a further object is to provide a competing developing agent which will not reduce the maximum density of a red-sensitive emulsion layer, will not reduce the clarity of a cyan color developing agent and which will not reduce the photographic properties of the emulsion, such as reversal sensitivity, red purity and the red filter density-blue filter density ratio, without reducing the stability of the cyan developer.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The aforesaid objects of the present invention are accomplished according to this invention by using certain α, α'-di(hydroxyanilino)-substituted xylenes as competing developing agents in color developer solutions. The water-soluble competing developing agents of the present invention include those represented by the formula:

(I)



wherein X and X' each represents a p-hydroxyanilino group, of which the benzene ring may further be substituted by an alkyl group having from one to four carbon atoms such as methyl, ethyl, propyl, butyl; a hydroxy-alkyl group having from one to four carbon atoms, such as hydroxymethyl, hydroxyethyl, hydroxypropyl, hydroxybutyl; an alkoxy group having from one to four carbon atoms such as methoxy, ethoxy, propyoxy, butoxy; or a halogen atom; and the X'–CH_2–group may be located on the o-, m- or p-position with respect to the position of the X–CH_2–group.

The color developer composition of the present invention comprises, therefore: (1) a primary aromatic amino developing agent, (2) a color-forming coupler, (3) an alkali material, and (4) a water-soluble competing developing agent having the formula (I).

The competing developing agents of this invention are used to advantage in color developer solutions for processing color photographic elements in instances where it is desirable to control color contrast, fog, etc. The competing developing agents of the present invention are unexpectedly better than some known competing developing agents and are valuable for use in color photographic processing. In particular, when the competing developing agent of the present invention is used by incorporation in a cyan color developer which contains a p-phenylenediamine type color developing agent, a phenolic or naphtholic cyan color former and an alkali, excellent results are obtained. That is, as the bulk or size of the compounds of this invention is larger than that of known competing developing agents, the diffusing tendency of the compounds into the emulsion layers of multilayer photographic elements is lowered and therefore, only the upper layers, i.e., a blue-sensitive layer and a green-sensitive layer, are effectively subjected to the black and white development, while the lowermost red-sensitive layer is hardly developed. Consequently, the use of the competing developing agents of this invention provides such merit that the formation of cyan fog of blue-sensitive layer and green-sensitive layer is effectively prevented, while the decrease in density of cyan dye image of the red-sensitive layer can be prevented.

Furthermore, the color developer containing the competing developing agent of this invention shows better stability or gives less degradation of its properties and provides images having good photographic characteristics when the developer is stored or repeatedly used for a long period of time, as compared with the same solution containing a conventional competing developing agent.

The following typical examples will serve to illustrate our competing developing agents, but it is to be understood that our invention is not limited to these examples.

Compound 1	α, α'-di(p-hydroxyanilino)-p-xylene
Compound 2	α, α'-di(p-hydroxyanilino)-m-xylene
Compound 3	α, α'-di(3-methyl-4-hydroxyanilino)-p-xylene
Compound 4	α, α'-di(3-methyl-4-hydroxyanilino)-m-xylene

It is advantageous to include a compound, such as hydroxylamine sulfate, hydroxylamine hydrochloride, etc. in the aqueous solution of the color developer composition in order to extend the useful life of the developer especially during storage.

The concentration of the competing developing agents of this invention will vary, depending upon the type and concentration of the color developing agent and coupler used in the color developer, and will also vary with the pH of the color developer. However, in general, a concentration of 0.01–5.0 g./liter of developer is preferably employed. Further, it has been found that the most effective concentration utilized is about 0.1–1.0 g./liter.

The competing developing agents of this invention are commonly used in the form of a salt, such as the hydrochloride, which is more stable than the free amine.

The competing developing agents of this invention can be effectively used in any cyan color developer, magenta color developer or yellow color developer, but it is most effectively used in a cyan color developer.

The color developing agent used in the color developer composition of this invention is a general p-phenylene diamine derivative, such as: N, N-diethyl-p-phenylenediamine sulfite; N, N-diethyl-3-methyl-p-phenylenediamine hydrochloride; 4-amino-3-methyl-N-ethyl-N-methanesulfonamido ethylaniline sulfate; 4-amino-3-methyl-N-ethyl-N-hydroxyethylaniline sulfate; N-ethyl-N-hydroxyethyl-p-phenylenediamine sulfate, etc. The p-aminophenols and their substituted materials may also be used.

Moreover, as illustrative of the color formers used in this invention, there are: 2,4-dichloro-1-naphthol; 2,4-dichloro-5-tolysulfonamido-1-naphthol; 1-oxy-2-benzylnaphthamide; 2,6-dibromo-1,5-dihydroxynaphthalene; benzoylacetanilide; ω-benzoyl-4-(p-toluenesulfonamido)acetanilide; 1-phenyl-3-(m-nitrobenzoylamino)-5-pyrazolone; and cyanoacetyl coumaron. However, other color formers which are conventionally utilized may be employed in this invention.

The preparation of the novel competing developing agents used in this invention may be illustrated by the examples shown below.

1. Preparation of α, α'-di(p-hydroxyanilino)-p-xylene (compound 1)

A mixture of 16.3 g. of p-aminophenol and 10 g. of terephthalaldehyde was refluxed *

2. Preparation of α, α'-di(p-hydroxyanilino)-m-xylene (compound 2)

A Schiff base prepared by the reaction of 16.3 g. of p-aminophenol with 10 g. of isophthalaldehyde in 500 ml. of ethanol was reduced with sodium borohydride as in the preparation of compound 1. The amine compound thus obtained was recrystallized from benzene-ethyl acetate to yield 14.5 g. of the above-mentioned product having a melting point of 150°–155° C. The hydrochloride of this compound is in the form of colorless needles having a melting point of above 190° C. (softened gradually).

3. Preparation of α, α'-di(3-methyl-4-hydroxyanilino)-p-xylene (compound 3)

By repeating the same procedure as in the preparation of compound 1 using 4.29 g. of 3-methyl-4-hydroxyanilino and 2.68 g. of terephthalaldehyde as starting materials, 4 g. of the hydrochloride of compound 3 was obtained as colorless crystals having a melting point of 220°–240° C. (decomposed).

4. Preparation of α, α'-di(3-methyl-4-hydroxyanilino)-m-xylene (compound 4)

By repeating the same procedure as in the preparation of compound 1 using 4.92 g. of 3-methyl-4-hydroxyaniline and 2.68 g. of isophthalaldehyde as starting materials, 3.6 g. of the hydrochloride of compound 4 was obtained as colorless crystals having a melting point of 150°–170° C. (decomposed).

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*Refluxing, of course, at boiling point of solvent in examples. for 20 minutes in 400 ml. of ethanol and the reaction product was cooled to provide 19.5 g. of a Schiff base. This Schiff base was mixed with 300 ml. of methanol and, while stirring the mixture at room temperature, 4.7 g. of sodium borohydride was gradually added to it. The reaction mixture was poured into 1000 ml. of ice water containing 8 ml. of acetic acid and a solid formed was separated, and recrystallized from n-butanol to yield 13 g. of α, α'-di(p-hydroxyanilino)-p-xylene having a melting point of 183.5–185°Φ C. The hydrochloride of this compound is in the form of colorless needles having a melting point of above 300° C. (decomposed).

The following examples show that a color developer containing the competing developing agent of this invention is quite superior to color developers which contain conventional competing developing agents.

EXAMPLE 1

A multilayer color photographic film was formed of the following layers (in the order given) on a photographic film support: a red-sensitive gelatino silver iodo-bromide emulsion layer, a green-sensitive gelatino silver iodo-bromide emulsion layer, a blue-absorbing yellow filter layer comprising colloidal silver, and a blue-sensitive gelatino silver iodo-bromide emulsion layer. This film was exposed by means of a sensitometer and subjected to the following processings:

Process	Temp.	Time
First black and white development	24° C.	5 min.
Washing	24° C.	2 min.
Reversal exposure (red) at 200 CMS from the reverse side	24° C.	
Cyan color development	24° C.	5 min.
Washing	24° C.	2 min.
Reversal exposure (blue) at 200 CMS from the surface		
Yellow color development	24° C.	5 min.
Washing	24° C.	2 min.
Second black and white development	24° C.	2 min.
Washing	24° C.	2 min.
Reversal exposure (white light) at 200 CMS from both sides.		
Magenta color development	24° C.	5 min.
Washing	24° C.	8 min.
Bleaching	24° C.	2 min.
Washing	24° C.	2 min.
Fixing	24° C.	2 min.
Washing	24° C.	2 min.

The compositions of the processing baths used in the above processings are as follows:

Black and White Developer

N-methyl-p-aminophenol sulfate	2.0 g.
Sodium sulfite	9.0 g.
Hydroquinone	8.0 g.
Sodium carbonate (mono-hydrate)	52.5 g.
Potassium bromide	5.0 g.
Potassium thiocyanate	1.0 g.
Water to make	1000 ml.

Cyan Color Developer

Sodium sulfite	5.0 g.
2-Amino-5N,N-diethylamino toluene hydrochloride	0.6 g.
Sodium carbonate (mono-hydrate)	15.0 g.
Potassium bromide	0.5 g.
Potassium iodide (0.1% aq. solution.)	5 ml.
1,5-dihydroxy-2,6-dibromonaphthalene	1.2 g.
Sodium hydroxide	2.0 g.
Water to make	1000 ml.

Yellow Color Developer

Sodium sulfite	5.0 g.
N,N-diethyl-p-phenylenediamine sulfite	2.5 g.
Potassium bromide	1.0 g.
Potassium iodide (0.1% aq. solution)	5.0 ml.
ω-benzoyl-4-(p-toluenesulfonamido) acetanilide	1.2 g.
Sodium hydroxide	2.5 g.
Water to make	1000 ml.

Magenta Color Developer

Sodium sulfite	5.0 g.
2-Amino-5-N,N-diethylaminotoluene hydrochloride	2.0 g.
Potassium bromide	0.8 g.
1-Phenyl-3-(m-nitrobenzoylamino)-5-pyrozolone	1.4 g.
Sodium hydroxide	2.0 g.
n-Butylamine	5.0 ml.
Water to make	1000 ml.

Bleaching Solution

Potassium ferricyanide	100.0 g.
Potassium bromide	10.0 g.
Borax	20.0 g.
Boric acid	1.0 g.
Water to make	1000 ml.

Fixing Solution

Sodium thiosulfate	150.0 g.
Sodium sulfite	10.0 g.
Water to make	1000 ml.

In the aforesaid reversal color developing process, the competing developing agents shown in the following table were (individually) added to the cyan color developer, and the effect of the competing developing agents on the photographic properties of the film was measured.

Exp. No.	Competing Developing Agent	Amount*
1	N-enzyl-p-aminophenol hydrochloride	0.85
2	α, α'-di(p-hydroxyanilino)-p-xylene hydrochloride	0.425
3	α, α'-di(p-hydroxyanilino)-m-xylene hydrochloride	0.425

* m.moles/1000 ml. of developer.

The photographic properties of the film processed are shown in the following table, with each of the three competing developing agents in which: (1) the reversal sensitivity is shown by the inverse logarithm of the amount of exposure at which the coupling density obtained corresponds to 1.0; 2) the purity of the red color reproduction is shown by the ratio of the red filter density to the green filter density (D_r/D_g) of a portion of the film exposed to red light (called red patch): and (3) the ratio of the red filter density to the blue filter density (D_r/D_b) of said portion is also shown. The ratio D_r/D_g or D_r/D_b is a value which illustrates the color purity of a reproduced color when a red object is reproduced in a color photograph, and the smaller than this value is, the better the reproduction.

Exp. No.	Reversal Sensitivity			Purity of red color reproduced	
	Cyan	Yellow	Magenta	D_r/D_g	D_r/D_b
1	1.13	1.27	1.20	0.33	0.27
2	1.16	1.29	1.23	0.29	0.23
3	1.15	1.28	1.23	0.28	0.24

These results show clearly that by the incorporation of the competing developing agent of this invention, a high reversal sensitivity and a preferred red purity can be obtained, when compared with the conventionally known N-benzyl-p-aminophenol hydrochloride.

After allowing the cyan color developers to age for 7 days (open to the atmosphere to cause air oxidation), the above procedure was repeated using the now degraded color developers, and the extent of degradation was measured. The results of the degradation measurement are shown in the following table.

Exp. No.	Reversal sensitivity				Purity of red color reproduced	
	Cyan	Yellow	Magenta		D_r/D_g	D_r/D_b
1	0.68	1.07	0.92		0.38	0.34
2	0.78	1.09	0.97	0.34	0.28	
3	0.76	1.08	0.95		0.35	0.29

These results show that by the addition of the competing developing agent of this invention, the cyan color developer will exhibit a more constant effect, even when it is degraded by air oxidation, when compared with the case of adding a conventional competing developing agent. This particular advantage of the competing agent of this invention was not anticipated, and it shows even more clearly the excellent usefulness of the competing developing agent of the present invention.

EXAMPLE 2

Using the same basic procedures as in example 1, a cyan color development was carried out. After being washed with water for eight minutes after the cyan development, the cyan-developed color film was subjected to bleaching, washing and fixing, as in example 1, to provide cyan-colored images. In this case, the photographic properties of the color photographs which were improved by the competing developing agent of this invention were measured, the results of which are shown in the following table. In the table, the reversal sensitivity (A) relates to the red-sensitive emulsion layer, and the cyan contamination density (B) is shown by the sum of the cyan coupling density in the portion of the green-sensitive emulsion layer exposed to red light and the cyan coupling density in the portion of the blue-sensitive emulsion layer exposed to red light. These two light sensitive emulsion layers are ones which will not be developed to any extent in a cyan color development, and hence, cyan coupling these portions causes undesirable developing fogs in the green-sensitive emulsion layer to be magenta coupled and undesirable fogs in the blue-sensitive emulsion layer to be yellow coupled. In other words, the cyan coupling causes color turbidity, which results in degrading of the quality of the color photographic image.

Exp. No.	Competing developing agent	Amount [1]	(A) [2]	(B) [3]
1..........	N-benzyl-p-aminophenol hydrochloride.	0.85	1.27	0.38
2..........	α,α'-Di(p-hydroxyanilino)-p-xylene hydrochloride.	0.425	1.31	0.34
3..........	α,α'-Di(p-hydroxyanilino)-m-xylene hydrochloride.	0.425	1.29	0.35

[1] M. mole per 1000 ml. of developer.
[2] Reversal sensitivity.
[3] Cyan contamination color density.

The results show that the competing developing agent of this invention has an excellent effect when compared with a conventional competing developing agent, N-benzyl-p-aminophenol hydrochloride.

EXAMPLE 3

The cyan color developer used in example 2 was forcibly degraded by developing 2800 sq. cm. of a color film with 1000 ml. of the cyan developer in a light room. Thereafter, the same basic procedure used in example 2 was repeated using the thus degraded cyan developer, the results of which are shown in the following table. (In this experiment, the amount of competing developing agent used was the same as that in example 2).

Exp. No.	Competing developing agent	(A) [1]	(B) [2]
1..........	N-benzyl-p-aminophenol hydrochloride......	1.05	0.63
2..........	α,α'-Di(p-hydroxyanilino)-p-xylene hydrochloride.	1.11	0.57
3..........	α,α'Di(p-hydroxyanilino)-m-xylene hydrochloride.	1.09	0.60

[1] Reversal sensitivity.
[2] Cyan contamination color density.

The cyan developer containing the competing developing agent of this invention again gave excellent results in comparison to the cyan developer containing the known competing developing agent.

EXAMPLE 4

The same basic procedure as was used in example 1 was repeated while conducting the cyan development for 6 minutes at 24° C. using the following cyan developer:

Cyan Color Developer

Sodium sulfite	5.0 g.
Sodium sulfate	50.0 g.
N,N-diethyl-p-phenylenediamine sulfite	2.8 g.
Potassium bromide	2.0 g.
Potassium iodide (0.1% aq. soln.)	5.0 g.
2,4-dichloro-5-(p-toluenesulfonamido)-1-naphthol	2.0 g.
Sodium hydroxide	2.5 g.
Hydroxyamine sulfate	0.5 g.
Water to make	1000 ml.

The photographic properties obtained by adding the competing developing agent of this invention to the cyan developer were compared with those obtained by adding thereto a conventional competing developing agent, N-benzyl-p-aminophenol hydrochloride. The amount and type of competing developing agent used are shown below:

Exp. No.	Competing Developing Agent	Amount*
1	N-benzyl-p-aminophenol hydrochloride	0.85
2	α, α'-di(p-hydroxyanilino)-p-xylene hydrochloride	0.85
3	α, α'-di(p-hydroxyanilino)-m-xylene hydrochloride	0.85

*m. moles/1000 ml. of developer.

The results obtained are shown in the following table.

Exp. No.	Reversal sensitivity			Purity of red color reproduced	
	Cyan	Yellow	Magenta	D_r/D_g	D_r/D_b
1	1.20	1.31	1.26	0.25	0.23
2	1.30	1.42	1.36	0.21	0.20
3	1.29	1.40	1.35	0.22	0.20

After allowing the three kinds of cyan developers to oxidize in air for 7 days, the same procedure used above was repeated, again using the cyan developers. The effect of the degraded cyan developers on the photographic properties was then determined, the results of which are shown in the following table:

Exp. No.	Reversal Sensitivity			Purity of Red Color Reproduced	
	Cyan	Yellow	Magenta	D_r/D_g	D_r/D_b
1	0.97	1.08	1.10	0.35	0.33
2	1.10	1.16	1.17	0.30	0.31
3	1.08	1.14	1.14	0.31	0.31

It can be seen that the competing developing agent of this invention illustrated an excellent effect during this experiment, when compared with the known competing developing agent.

EXAMPLE 5

The same basic procedure as was in example 1 was repeated while incorporating a competing developing agent (including a known competing developing agent) in each of the cyan color developers (the types and amounts utilized being shown in the following table:)

Exp. No.	Competing developing agent	Amount*
1	N-benzyl-p-aminophenol hydrochloride	0.85
2	α, α'-di(p-hydroxyanilino)-m-xylene hydrochloride	0.60
3	α, α'-di(3-methyl-4-hydroxyanilino)-m-xylene hydrochloride	0.60

*: m/mole/1000 ml. of developer.

The multilayer color photographic films thus prepared were processed as in example 1, using the aforesaid cyan developers, the results of this processing being as follows:

Exp. No.	Reversal Sensitivity	Purity of red color reproduced

	Cyan	Yellow	Magenta	D_r/D_g	D_r/D_b
1	1.13	1.27	1.20	0.33	0.27
2	1.15	1.28	1.24	0.30	0.25
3	1.18	1.29	1.26	0.29	0.24

These results show that the competing developing agents of this invention will give a high reversal sensitivity and a high red color reproduction purity in the red-sensitive emulsion layer in comparison with the conventional competing developing agent.

We claim:

1. A color developer composition comprising a primary aromatic amino developing agent, a color-forming coupler, an alkali, and a water-soluble competing developing agent having the formula:

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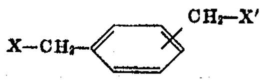


wherein X and X' each represents a p-hydroxyanilino group of which the benzene ring may further be substituted by a member selected from the class consisting of an alkyl group having from one to four carbon atoms, a hydroxyalkyl group having from one to four carbon atoms, an alkoxy group having from one to four carbon atoms and a halogen atom, and the X'–CH_2–group may be located at the o-, m- or p-position to the position of the X–CH_2–group.

2. A color developer composition as in claim 1 containing a member selected from the class consisting of an alkali metal bromide, an alkali metal sulfite and an alkali metal iodide.

3. A color developer composition of claim 1 containing a color-forming coupler selected from the class consisting of the phenolic couplers, the naphtholic couplers, the pyrazolone couplers, the coumarone couplers and the open-chain ketomethylene couplers.

4. A color developer composition of claim 1 containing a primary aromatic amino developing agent selected from the class consisting of a 4-aminophenol and a p-phenylenediamine.

5. A color developer composition as claimed in claim 1 comprising a primary aromatic amino developing agent, a color-forming coupler, an alkali, and α, α'-di(p-hydroxyanilino)-p-xylene hydrochloride, wherein said competing developing agent is present in the amount of 0.01 to 5.0 g./liter of developer.

6. A color developer composition as claimed in claim 1 comprising a primary aromatic amino developing agent, a color-forming coupler, an alkali, and α, α'-di(p-hydroxyanilino)-m-xylene hydrochloride, wherein said competing developing agent is present in the amount of 0.01 to 5.0 g./liter of developer.

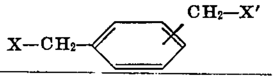
7. A color developer composition as claimed in claim 1 comprising a primary aromatic amino developing agent, a color-forming coupler, an alkali, and α, α'-di(3-methyl-4-hydroxyanilino)-p-xylene hydrochloride, wherein said competing developing agent is present in the amount of 0.01 to 5.0 g./liter of developer.

8. A color developer composition as claimed in claim 1 comprising a primary aromatic amino developing agent, a color-forming coupler, an alkali, and α, α'-di(3-methyl-4-hydroxyanilino)-m-xylene hydrochloride, wherein said competing developing agent is present in the amount of 0.01 to 5.0 g./liter of developer.

9. In a color reversal development of a multilayer, multicolor photographic element wherein color developers are utilized, the improvement which comprises utilizing, in at least one of said color developers, a water soluble competing developing agent having the formula:

wherein X and X' each represents a p-hydroxyanilino group of which the benzene ring may further be substituted by a member selected from the class consisting of an alkyl group having from one to four carbon atoms, a hydroxyalkyl group having from one to four carbon atoms, an alkoxy group having from one to four carbon atoms, and a halogen atom, and the X'–CH_2–group may be located at the o-, m- or p-position to the position of the X–CH_2–group.

10. A color reversal development of a multilayer, multicolor photographic element as claimed in claim 9, further comprising after exposure to light through an original image of a support coated with differently sensitive silver halide emulsion layers, one of said layers being red-sensitive, one of said layers being green-sensitive and one of said layers being blue-sensitive, in which the said exposed elements are given a negative black and white development, selective reexposure of said red-sensitive layer with red light, treatment of said element with a cyan color developer, selective reexposure of the said blue-sensitive layer with blue light, treatment of said element with a yellow color developer, fogging the unexposed silver halide in the green-sensitive layer, treating the said element with a magenta color developer, treating said developed element in a ferricyanide-bromide bleach and then in a fixing bath, to leave in said element a color reproduction of said original image, the improvement in the said process comprising the use, in at least one of said color developers, of a water-soluble competing developing agent having the formula:



wherein X and X' each represents a p-hydroxyanilino group of which the benzene ring may further be substituted by a member selected from the class consisting of an alkyl group having from one to four carbon atoms, a hydroxyalkyl group having from one to four carbon atoms, an alkoxy group having from one to four carbon atoms and a halogen atom, and the X'–CH_2–group may be located at the o-, m-, or p-position to the position of the X–CH_2 group.

11. In the color reversal development process of claim 9 for a multilayer, multicolor photographic element, the improvement in the said process comprising the use of α, α'-di(p-hydroxyanilino)-p-xylene as a competing developing agent in the cyan developer solution, wherein the competing developing is present in the amount of 0.01 to 5.0 g./liter of the developer.

12. In the color reversal development process of claim 9 for a multilayer, multicolor photographic element, the improvement in the said process comprising the use of α, α'-di(p-hydroxyanilino)-p-xylene as a competing developing agent in the yellow developer solution, wherein the competing developing is present in the amount of 0.01 to 5.0 g./liter of the developer.

13. In the color reversal development process of claim 9 for a multilayer, multicolor photographic element, the improvement in the said process comprising the use of α, α'-di(p-hydroxyanilino)-p-xylene as a competing developing agent in the magenta developer solution, wherein the competing developing is present in the amount of 0.01 to 5.0 g./liter of the developer.

14. A composition for preparing a color developer solution, said composition comprising a primary aromatic amino developing agent and a water-soluble competing developing agent having the formula:

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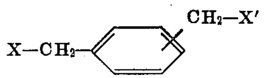

wherein X and X' each represents a p-hydroxyanilino group of which the benzene ring may further be substituted by a member selected from the class consisting of an alkyl group having from one to four carbon atoms, a hydroxyalkyl group having from one to four carbon atoms, an alkoxyl group having one to four carbon atoms and a halogen atom, and the X'–CH$_2$–group may be located on the o-, m- or p-position to the position of the X–CH$_2$–group.

15. The composition as claimed in claim **14** wherein the competing developing agent is α, α'-di(p-hydroxyanilino)-p-xylene hydrochloride.

16. The composition as claimed in claim **14** wherein the competing developing agent is α, α'-di(p-hydroxyanilino)-m-xylene hydrochloride.

17. The composition as claimed in claim **14** wherein the competing developing agent is α, α'-di(3-methyl-4-hydroxyanilino)-p-xylene hydrochloride.

18. The composition as claimed in claim **14** wherein the competing developing agent is α, α'-di(3-methyl-4-hydroxyanilino)-m-xylene hydrochloride.

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