United States Patent [19]

Simon

[11] **3,711,546**

[45] **Jan. 16, 1973**

[54] **N-(ORTHO-SUBSTITUTED BENZENE OR NAPHTHALENE CARBOXAMIDOETHYLE)PARA-PHENYLENE DIAMINES AS COUPLER-DEVELOPERS**

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[22] Filed: **June 9, 1969**

[21] Appl. No.: **847,768**

Related U.S. Application Data

[62] Division of Ser. No. 598,870, Dec. 2, 1966, Pat. No. 3,537,850.

[52] **U.S. Cl.**.....**260/559 S,** 260/559 A, 260/558 A, 260/518 R, 260/519, 260/507 R, 260/560, 260/570 R, 260/562 K, 260/310 A, 260/577, 260/479 R, 260/207, 260/207.1, 260/571

[51] **Int. Cl.**.....**C07c 103/26**

[58] **Field of Search**....260/559 S, 560, 570 B, 562 K, 260/571, 310 A, 558 A, 559 A, 518 R, 519, 507 R

[56] **References Cited**

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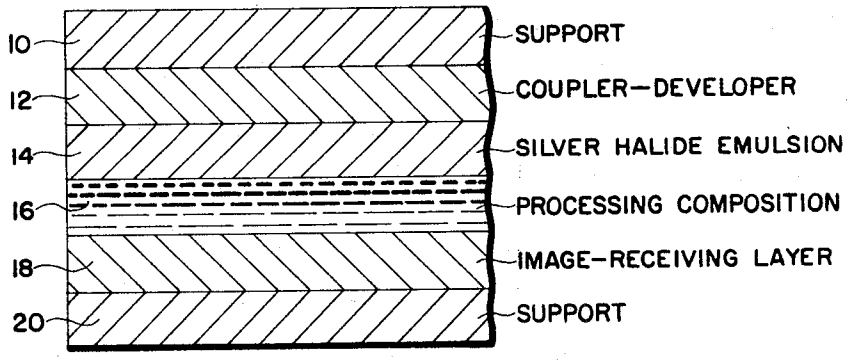
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[57] **ABSTRACT**

Novel coupler developers for preparing color transfer images. Essentially the coupler developers contain a coupling moiety linked to a silver halide developing moiety.

3 Claims, 1 Drawing Figure



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N-(ORTHO-SUBSTITUTED BENZENE OR NAPHTHALENE CARBOXAMIDOETHYLE)PARA-PHENYLENE DIAMINES AS COUPLER-DEVELOPERS

This application is a division of application Ser. No. 598,870 filed Dec. 2, 1966 now U. S. Pat. No. 3,537,850.

This invention relates to photography and, more particularly, to novel processes and products for preparing color transfer images.

A primary object of this invention, therefore, is to provide novel processes and products for preparing color images by diffusion transfer.

Another object is to provide novel photographic systems wherein an exposed light-sensitive silver halide emulsion is developed in the presence of a compound which is both a color developer and a coupler, the developer moiety is selectively oxidized as a function of development, the oxidized compound couples inter-molecularly to form a non-diffusible reaction product of substantially higher molecular weight, while the unreacted compound is free to transfer by imbibition to a superposed layer or stratum where it is oxidized and then couples inter-molecularly to form a positive dye transfer image.

Still another object is to provide novel compounds for use in the aforementioned systems.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises the several steps and the relation and order of one or more of such steps with respect to each of the others, and the products possessing the features, properties, and the relation of elements which are exemplified in the following detailed disclosure, and the scope of the application of which will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in conjunction with the accompanying drawing wherein:

The FIGURE is a partially schematic, partially enlarged fragmentary sectional view illustrating a previously exposed photographic product of this invention during processing thereof.

The objectives of this invention are accomplished by providing novel processes and products utilizing a novel class of compounds which contain both a coupling moiety and a silver halide developing moiety, hereinafter referred to as "coupler-developers." The coupling moiety is selected from the class of color couplers heretofore known to couple with oxidized color developer, e.g., phenol, naphthol, aniline, naphthylamine or active methylene color couplers, etc., and the developer moiety in turn is selected from the class of color developers which are heretofore known to provide an oxidation product which may couple with color couplers of the foregoing description to form a dye, e.g., an indoaniline, indophenol, or an azomethine dye. The coupler and developer moieties are so positioned in the molecule with respect to one another so as to preclude self-coupling or intramolecular coupling between the coupler moiety and oxidized developer moiety.

The coupler-developers of this invention may be represented by the following formula:

(A) $X—L_{(n-1)}—D$

wherein:

X represents a color coupler, e.g., a hydroxy-phenyl, α-hydroxynaphthyl, aminophenyl, α-aminonaphthyl or methylene color coupler such as described, for example, in Mees, "The Theory of the Photographic Process," Revised Edition, 1954, pp. 594–604;

D represents an aromatic primary amino color developer moiety, e.g., of the p-aminophenol and p-phenylenediamine series;

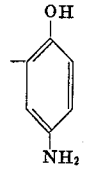
L is a divalent linking group linking the developer moiety, D, to the coupler moiety, X; and

n is a positive integer from 1 to 2, the developer moiety, D, being positioned in the molecule with respect to the coupler moiety, X, so as to preclude self-coupling. This may be effected in the following manner:

1. having the primary amino substituent of the developer moiety separated from the coupling position of the coupler moiety by more than four or less than three other atoms so as to preclude self-coupling to form a five- or six- membered ring; or

2. in instances where the amino substituent is separated from the coupling position by four atoms, the developer moiety is not linked to the coupler in a position ortho-, or in the case of naphthyl couplers, peri- to the coupling position.

While the developer moiety may be the radical of a p-aminophenol color developer, e.g.,



and the known substituted derivatives thereof, the preferred color developer moieties are monovalent radicals of color developers of the p-phenylenediamine series. As examples of useful color developers of this class, mention may be made of:

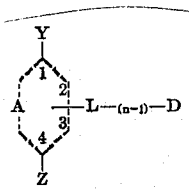
N,N-diethyl-p-phenylenediamine,
2,-amino-5-diethylamino toluene,
N-ethyl-β-methanesulfonamido-ethyl-3-methyl-4-amino-aniline,
4-amino-N-ethyl-3-methyl-N-(β-sulfoethyl)aniline,
4-amino-N-ethyl-3-methoxy-N-(β-sulfoethyl)aniline,
4-amino-N-ethyl-N-(β-hydroxyethyl)aniline,
4-amino-N,N-diethyl-3-hydroxymethyl aniline,
4-amino-N-methyl-N-(β-carboxyethyl)aniline,
4-amino-N,N-bis(β-hydroxyethyl)aniline,
4-amino-N,N-bis(β-hydroxyethyl)-3-3-methyl aniline,
3-acetamido-4-amino-N,N-bis(β-hydroxyethyl)aniline,
4-amino-N-ethyl-N-(2,3-dihydroxypropyl)-3-methylaniline sulfate salt,
4-amino-N,N-diethyl-3-(3-hydroxypropoxy)aniline,
and the like.

The color developer moiety may, for reasons to be discussed hereinafter, be present as a Schiff base derivative.

The divalent linking radical, L, may be any of the linking radicals heretofore disclosed in the art as useful to link a developing moiety to a dye moiety to provide a dye developer, i.e., a dye which is also a silver halide developing agent. Dye developers and the use thereof are described and claimed, for example, in U. S. Pat. No. 2,983,606, issued to Howard G. Rogers. Useful linking groups are disclosed in this patent and in particular are described and claimed in U. S. Pat. No. 3,255,001 issued June 7, 1966 to Elkan R. Blout and Howard G. Rogers, as well as in other issued patents. Such linking groups include, by way of example, alkylene, phenylene, -alkylphenyl-, —CO—, —CONH-alkyl-, etc.

As was mentioned previously, the coupling moiety may be selected from any of the known couplers such as are described, for example, in the aforementioned Mees text. The preferred couplers are taken from the classes of α-naphthol, phenol, aniline and α-naphthylamine couplers, including substituted derivatives thereof. This preferred class may be represented by the formula:

(B)



wherein:

L, *n* and D have the meanings heretofore noted;

Y is hydroxy or amino, e.g., a primary, secondary or tertiary amino substituent of the formula



wherein each R may be hydrogen, a hydrocarbon radical, e.g., alkyl, such as methyl, ethyl, butyl, dodecyl, etc., aryl such as phenyl or naphthyl attached through a carbon atom thereof to the nitrogen atom, a cyclic alkyl such as cyclopentyl or cyclohexyl, i.e., where both R's are alkylene comprising together with the nitrogen atom a heterocyclic ring, a substituted alkyl, such as hydroxyethyl, methoxyethoxyethyl, polyglycoloxyethyl, carboxymethyl, carboxyethyl, ethylcarboxymethyl, benzyl, phenylethyl, sulfo-phenylethyl, acetylaminophenylethyl, succinylamino, phenylethyl, furanemethyl, or a substituted aryl such as methylphenyl, ethylphenyl, etc., couplers containing such substituents being disclosed, for example, in U. S. Pat. No. 3,245,795, compounds wherein Y is hydroxy being the most preferred;

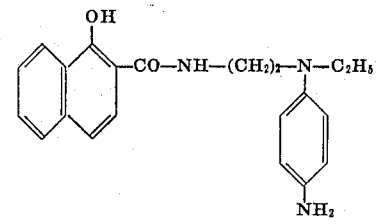
Z represents a coupling position para to the Y substituent and may be hydrogen or any of the substituents heretofore known in the art (such as disclosed in the aforementioned Mees text) which are replaceable by oxidized aromatic amino color developer in so-called elimination-coupling reactions, e.g., chloro, bromo, carboxy, sulfo, hydroxy, alkoxy, hydroxyalkyl, etc.; and

A represents the atoms necessary to complete an aromatic ring of the benzene or naphthalene series, which ring may be further substituted.

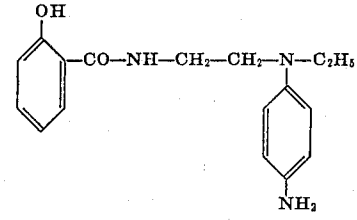
As in the coupler-developers of formula A, the developer moiety is positioned so as to preclude intramolecular coupling of the oxidation product.

As examples of useful compounds within the scope of Formulas A and/or B, mention may be made of:

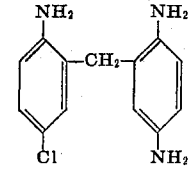
(1)



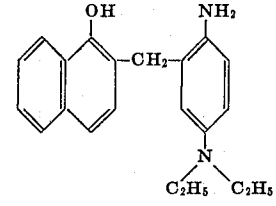
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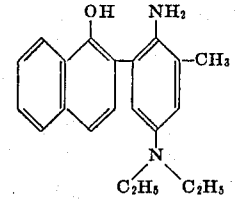
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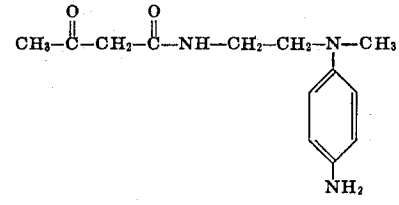
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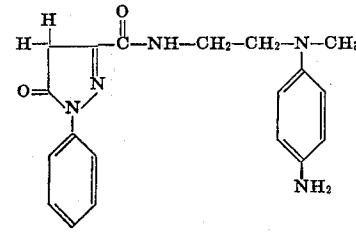
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(6)



(7)



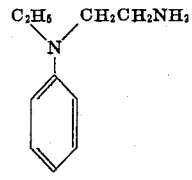
In general, the novel compounds of this invention, that is, the compounds of Formulas A and B, may be readily synthesized by appropriate replacement or sub-

stitution reactions between a compound providing the coupling moiety and a compound providing the color developer moiety. In some instances wherein the coupling moiety is a phenol or naphthol, it may be desirable for the hydroxy substituent to be protected during this reaction, e.g., by acylation. Following reaction, the protective group may be removed in known manner by hydrolysis. Since the general reactions by which the present compounds may be prepared are in general analogous to the preparation of dye developers such as disclosed in the aforementioned patents and elsewhere in the patent literature, the preparation of the present compounds will be readily apparent to those skilled in the art in the light of the present description, as exemplified by the following examples.

EXAMPLE 1

A mixture of 162.0 g. (1.34 M) of N-ethylaniline and 137.0 g. (0.67 M) of β-bromoethylamine hydrobromide was stirred for 105 minutes while the temperature was slowly raised to 145°C. [At about 105°–110°C. there was some heat of reaction which sent the temperature briefly to 140°C.] The mixture was then maintained at 145°C. with stirring for an additional 2 hours, after which it was cooled overnight and then poured into 400 ml. of 10 percent sodium hydroxide. It was then heated on a steambath, cooled, and the resulting mixture was extracted with either. The ethereal solution was dried over sodium hydroxide pellets, filtered, the ether evaporated, and then distilled to yield 59.8 g. (54.5 percent yield) of:

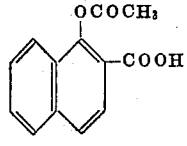
(I)



N-ethyl-N-β-aminoethyl-aniline

To a solution of 19.3 g. (0.084 M) of:

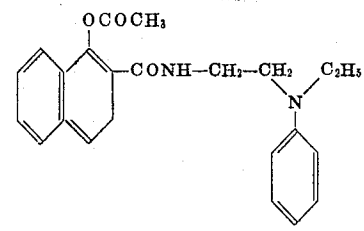
(II)



1-acetoxy-2-naphthoic acid

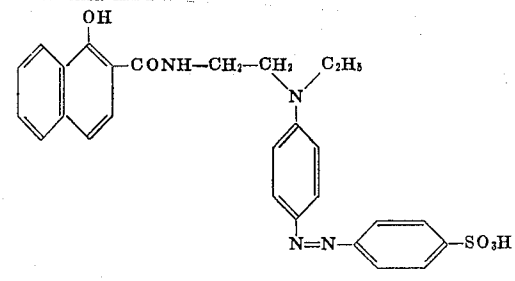
in 175 ml. of acetone, 11.8 ml. (0.84 M) of triethylamine were added. The mixture was cooled to −5°C. and 11.5 g. (0.84 M) of isobutylchloroformate were added. After stirring for about 25 minutes at −5° C., a solution of 14.5 g. (0.0885 M) of N-ethyl-N-β-aminoethyl-aniline (I) in 15 ml. of acetone was added. The resulting mixture was removed from the cold bath and stirred overnight at room temperature while protecting from moisture. The acetone was then evaporated in vacuo and the residue was treated with ice-water to yield a precipitate which was filtered, triturated with sodium bicarbonate solution, filtered, and then dried in vacuo over phosphorous pentoxide to yield a sticky solid. This solid was then titrated with hexane and filtered to provide 23.5 g. of a soupy white solid, m.p. 102°–110°C. dec. This solid was crystallized from 300 ml. of toluene to yield 13 g. (40 percent yield) of a gelatinous white precipitate, m.p. 129°–131 °C., of the formula:

(III)



A solution of 5.82 g. (0.0252 M) of sodium sulfanilate dihydrate in 30 ml. of water was cooled to 15°C. A solution of 1.76 g. (0.0252 M) of sodium nitrite in water was added and the resulting mixture was immediately poured into 5.1 ml. of concentrated HCl in 30 g. of ice. After allowing it to stand for about 20 minutes, the mixture was then poured into a chilled solution containing 9 g. (0.024 M) of the amide (III) in 60 ml. of methyl cellosolve plus 60 ml. of 3N HCl. The resulting pink mixture was stirred in the cold for 2½ hours and refrigerated overnight. It was then deaerated with a stream of nitrogen and kept under a blanket of nitrogen while 125 ml. of 3N sodium hydroxide were added. The reaction solution was then stirred at room temperature for 30 minutes, after which period it was neutralized with 25 ml. of acetic acid. HCl was added and the resulting dark gum was filtered off and dried in vacuo over phosphorous pentoxide and potassium hydroxide to yield 12 g. of a dark solid. This solid was further purified by dissolution in 500 ml. of hot water, filtering, and acidifying with dilute HCl to yield a precipitate which was filtered and dried to yield 9.2 g. of a maroon solid, m.p. 200°C. dec. with prior sintering. For further purification, 7.4 g. of the solid were stirred with 50 ml. of 3N sodium bicarbonate and 50 ml. of water for 30 minutes, filtered and acidified with 55 ml. of 3N HCl to yield a precipitate which was filtered and dried in vacuo over phosphorous pentoxide to yield 7.3 g. of a red azo dye, m.p. 200°–205°C., of the formula:

(IV)



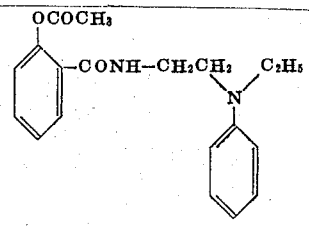
A solution was made under nitrogen, of 7.2 g. of this dye (IV), 150 ml. of water and 30 ml. of 3N sodium hydroxide. This solution was introduced into a Parr hydrogenator and reduced with hydrogen over 2 g. of palladium/barium sulfate. Hydrogen uptake was complete in 25 minuted to yield a colorless solution which was acidified with 50 ml. of 3N HCl, and catalyst

and occluded sulfanilic acid were filtered off. The filtrate was treated with aqueous acetic acid to a pH of about 4 to cause precipitation. Filtration, followed by drying in vacuo over phosphorous pentoxide yielded a yellow solid. Isolation was effected by solution in 15 ml. of warm acetic acid and filtration followed by addition of 15 ml. of acetic acid saturated with HCl then 150 ml. of dry ether, to yield a light-colored precipitate. This precipitate was filtered through a sintered glass filter and then transferred quickly to a desiccator where it was dried in vacuo over phosphorous pentoxide to yield 2.5 g. of the amino hydrochloride of the coupler-developer of Formula 1, a light colored solid, m.p. 100°–150°C. dec.

EXAMPLE 2

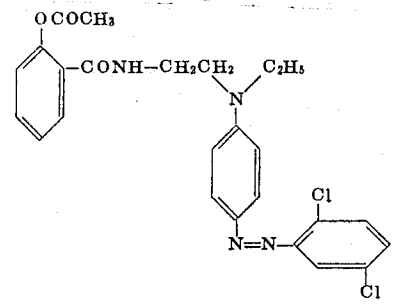
A mixture of 10.4 g. of acetylsalicylic acid in 122 cc. of acetone and 8.14 cc. of triethylamine was cooled with stirring to −5°C. 7.94 g. of isobutylchloroformate were then added to yield a white precipitate. After stirring at −5°C. for about 25 minutes, a solution of 10 g. of N-ethyl-N-β-aminoethyl-aniline (I) in 10 cc. of acetone was added. The reaction mixture was then removed from the cold bath, stirred overnight at room temperature, the acetone evaporated in vacuo, and cold water was added to the residue. The liquid phase was then decanted to provide a pasty product. This was purified by trituration with a small amount of ether, with water, and with sodium bicarbonate solution, washed with water and then dried in vacuo over phosphorous pentoxide to yield a white solid, m.p. about 70°C. This white solid was recrystallized from 250 cc. of ligroin and 50 cc. of toluene to yield 10 g. (50.3 percent yield) of a white crystal amide, m.p. 89°–91C., having the following formula:

(V)



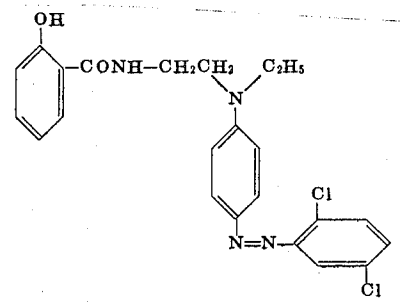
3.24 g. of 2,5-dichloroaniline were dissolved in a boiling solution of 8 cc. of conc. HCl and 35 cc. of water. The solution was cooled in an ice bath to about 10°C. at which temperature crystallization occurred. A cold solution of 1.39 g. of sodium nitrite in 3 cc. of water was added dropwise. The mixture was stirred for 10 minutes and filtered in the cold to provide a pale yellow solution. The solution was added slowly in the cold to a stirred solution of 6.52 g. of the amide (V) in 42 cc. of 3N HCl. The resulting mixture turned deep red and a precipitate started to form. The mixture was stirred at 0° to −5°C. for about 2½ hours and then filtered. Overnight more solid precipitated from the mother liquor and the solids were combined, the combined solids being:

(VI)



The acetylated azo dye (VI) was added to 100 cc. of previously deaerated 3N sodium hydroxide solution. After stirring for 2 hours until almost complete solution occurred, 100 cc. of 3N HCl were added dropwise while stirring vigorously to yield an orange precipitate which was filtered, washed with water, dried in air and recrystallized from about 100 cc. of benzene and 25 cc. of hexane to yield a product, m.p. 143°–146°C. This product was recrystallized once more from ethanol to yield 8.0 g. (86.6 percent yield) of the azo dye, m.p. 149°–151°C., having the formula:

(VII)



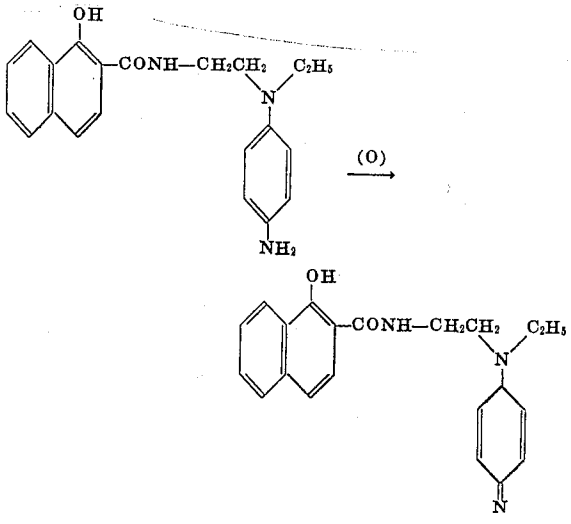
7.5 g. of the azo dye (VII) were dissolved in about 150 cc. of boiling ethanol, the solution cooled to about 40°–45C. (some of the dye crystallized out) and 1 g. of palladium/barium sulfate (10 percent) was added, then 1.37 cc. of conc. HCl. The dye was reduced in a Parr hydrogenator for about one hour and the catalyst was then filtered off. The ethanol was evaporated to about 15 cc. and a large excess of ether was added. The ether was stirred with a glass rod while heating on a steam-bath to yield a fine beige powder. This powder was dissolved in about 60 cc. of methanol on a steambath, filtered and rapidly reprecipitated with ether. It was then left in a refrigerator for about 2 hours and filtered to yield 1.2 g. of the coupler-developer of formula 2, as the dihydrochloride, a light beige powder, m.p. 229°–231°C.

This coupler-developer was also prepared from the acetylated amide (VI) by nitrosation and reduction of the nitroso group.

As was stated previously, the coupler-developers of this invention provide an oxidation product which can couple inter-molecularly, but which will not self-couple or couple intra-molecularly. When two molecules so couple, a dye of substantially higher molecular weight is formed. It will be apparent that three or more molecules of oxidized coupler-developer may couple to provide a polymeric dye of still higher molecular weight. In any event, the coupling of two or more molecules provides a dye which is relatively non-diffusible in the processing fluid.

With reference to the coupler-developer of Formula 1, the reaction mechanism upon which non-diffusible

dye formation is predicated may be illustrated as follows:



Following oxidation, e.g., by development of an exposed silver halide emulsion, the nitrogen atom [bearing the free valence] of one molecule of oxidized coupler-developer couples para to the naphtholic hydroxyl group of another molecule to form a dye. Further intermolecular coupling of other molecules of oxidized coupler-developer may occur to provide a polymeric dye of greater molecular weight.

The novel coupler-developer of this invention may be employed in various photographic systems wherein color transfer image is predicated upon an imagewise differential in mobility or diffusibility obtained as a function of developing an exposed light-sensitive silver halide emulsion. Such a system is illustrated in the drawing.

As shown therein, a photosensitive element comprising a support **10** having a layer **12** of coupler-developer and a light-sensitive silver halide emulsion layer **14** which has been previously exposed to contain a developable image, is developed by spreading an aqueous alkaline processing composition **16** between the thus exposed element and a superposed image-receiving element comprising an image-receiving layer or dyeable stratum **18** on a suitable support **20**. The processing composition permeates emulsion layer **14** to layer **12** where at least a portion of the coupler-developer in layer **12** is dissolved in the processing medium. [If the particular coupler-developer employed is not readily soluble in water, at least at the processing temperature employed, a suitable water-miscible organic solvent therefor may be contained in the processing composition.] The processing composition containing coupler-developer thus formed thereafter contacts the emulsion layer where the developing moiety reduces exposed silver halide to image silver and as a function thereof is in turn oxidized. This oxidized developer then couples intermolecularly in the manner previously described to form a dye in terms of exposed areas. This dye is relatively non-diffusible in the processing medium and hence remains in the photosensitive element. In unexposed areas, an imagewise distribution of unoxidized and diffusible coupler-developer remains. This latter imagewise distribution is transferred at least in part, by imbibition, to the superposed image-receiving layer or dyeable stratum to form thereon in terms of unexposed areas of the emulsion an imagewise distribution of coupler-developer. This imagewise distribution of unoxidized coupler-developer may then be oxidized to form a positive dye transfer image. The oxidation may be effected simply by exposure to air, e.g., upon separation of the respective elements following development, or, if desired, the receiving layer may contain an oxidizing agent to facilitate oxidation and subsequent dye formation.

In the color transfer process just described, it will be appreciated that a negative color image is formed in the photosensitive element. If desired the photosensitive element may be treated for removal of silver in conventional manner, e.g. by bleaching and subsequent fixation to provide a useful negative image. Any residual coupler-developer remaining in unexposed areas may also be removed by conventional techniques to provide clean highlight areas in the negative image. This aspect of the invention may be employed, for example, as a system for making positive reproductions from a negative, e.g., from a negative or reversed color transparency. Hence, as used herein, the terms "positive" and "negative" are given their ordinary meaning in the art and are intended to connote whether or not the image is a reverse image of the subject matter to which the novel film unit of this invention is exposed.

Either or both of supports **14** and **20** may be transparent or opaque, depending upon whether reflection prints or transparencies are contemplated. They may also be translucent or contain a translucent layer so that the resulting image may be viewed either by reflected or by transmitted light to provide a single image which is both a reflection print and a transparency. As examples of typical materials which may be employed for the respective supports, mention may be made of films of cellulose acetate, cellulose nitrate, polyvinyl acetal, polystyrene, polyethylene terephthalate, polyethylene, polypropylene, etc., paper, glass and others. As an example of a particularly useful material for preparing a translucent layer, mention may be made of titanium dioxide.

Layer **12** containing the coupler-developer may be prepared by applying to support **14** a coating containing the coupler-developer and a suitable polymeric matrix or carrier, e.g., cellulose acetate hydrogen phthalate, gelatin, etc.

Emulsion layer **14** may comprise any of the conventional silver halide emulsions, e.g., silver chloride, silver bromide, silver bromiodide, silver chlorobromide or silver chlorobromoiodide. The emulsion layer may also contain the various additives heretofore employed in such layers, e.g., optical sensitizers, antifoggants, hardeners, plasticizers, coating aids, speed-increasing materials, ultraviolet absorbers, etc. The dispersing agent or substrate for the silver halide may be gelatin or some other colloidal material.

Image-receiving layer **18** may be any of those heretofore known in the art, e.g., a copolymer of vinylacetate and vinyl alcohol, nylon, polyvinyl alcohol, gelatin, etc. and it may also include a suitable dye mordant such as poly-4-pyridine.

The developing composition comprises at least an aqueous solution of an alkaline material such as sodium or potassium hydroxide. As was mentioned previously, it may also contain a suitable water-miscible organic solvent for the coupler-developer, e.g., phenethyl al-

cohol. In addition, the processing composition may also contain other reagents performing specific desired functions, e.g., a viscous film-forming reagent such as hydroxyethyl cellulose, sodium carboxymethyl cellulose, etc. It is to be understood that any of these ingredients may be present initially in the film unit, in which case the processing composition containing the desired ingredients is formed during processing by contacting the film unit with the aqueous medium therefor. In any event, the processing composition may, if desired, be confined in a frangible container or "pod" such as described, for example, in U. S. Pat. Nos. 2,543,181 and 2,634,886, issued to Edwin H. Land.

While for purposes of illustration, the coupler-developer has been shown in the drawing as being in a separate layer in the photosensitive element, it may also be contained in the same layer as the silver halide emulsion. When present in the same layer, it may be advantageous to use forms that have substantial stability in photographic emulsions. For example, it may be desirable to have the primary amino developing moiety present in the emulsion as a Schiff base derivative. Such Schiff bases may be prepared by reacting primary amino developing agents with sulfonated, hydroxylated or carboxylated aromatic aldehydes of the benzene or naphthalene series. A typical Schiff base color developing agent can be prepared by reacting a color developer moiety, e.g., 2-amino-5-diethylaminotoluene, and o-sulfobenzaldehyde. As is known, the Schiff base derivatives are activated upon contact with the aqueous alkaline composition.

Other variations in procedure or in the arrangement of elements will be apparent in the light of the foregoing description.

The following example shows by way of illustration and not by way of limitation the practice of this invention.

EXAMPLE 3

A photosensitive element was prepared by coating a gelatin subcoated film base at a speed of 10 feet/minute with a solution comprising 0.125 g. of the coupler-developer of Formula 1 dissolved in 5 cc. of 4% cellulose acetate hydrogen phthalate in acetone. After this coating dried, a blue-sensitive silver iodobromide emulsion was coated on at a speed of 5 feet/minute and allowed to dry. This photosensitive element was exposed for 2 seconds and then developed by spreading between the thus exposed photosensitive element and a superposed image-receiving element at a gap of 0.0026 inch an aqueous processing composition comprising the following proportions of ingredients:

Water	100.0 cc.
Hydroxyethyl cellulose	4.5 g.
Sodium hydroxide	1.5 g.
Sodium carbonate	5.0 g.
Phenethyl alcohol	11.5 cc.

The image-receiving element was comprised of a 50:50 copolymer of vinylacetate-vinyl alcohol containing 0.6 percent benzoyl peroxide on a nitrate-subcoated sheet. After an imbibition time of approximately 1 minute, the image-receiving element was separated and contained a positive green-blue image.

The present invention makes it possible to obtain color transfer images of excellent quality and stability. The oxidative coupling in the photosensitive element as a function of development forms a non-diffusible reaction product so that transfer thereof is effectively precluded. This inability of unwanted dye to transfer makes it possible to obtain transfer images having minimal stain and exhibiting exceptionally clean highlight areas. Further, the polymeric nature of the dye makes it possible to obtain a dye image having exceptional stability to light, heat and other degradative forces.

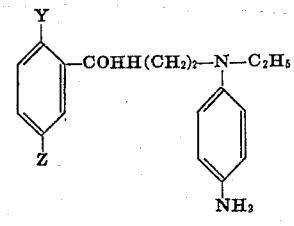
While the preparation of a monochromatic image has been described in the illustrative example, It will be appreciated that the invention is adaptable to the preparation of multicolor images. Systems for preparing multicolor images would, for example, employ multilayer photosensitive elements comprising at least two appropriately sensitized emulsion layers each having a suitable coupler-developer associated therewith.

It is also contemplated that a mixture of coupler-developers may be employed in a single emulsion system to provide a useful black-and-white process. Hence, as used throughout the specification and claims, the term "color" is intended to include the use of a black dye or a mixture of dyes to provide a black image.

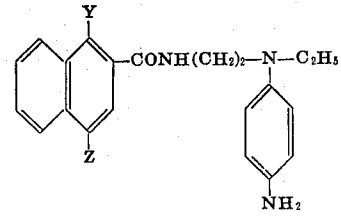
Since certain changes may be made in the above product and process without departing from the scope of the invention herein involved, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. A compound of the formula:

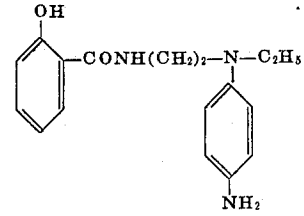


or

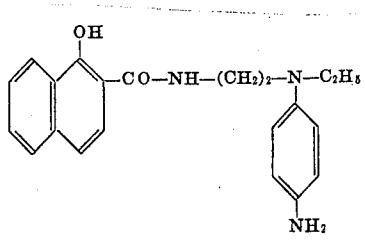


where Y is OH or NH_2 and Z represents a coupling position para to said Y substituent, said Z substituent being selected from the group consisting of hydrogen, chloro, bromo, carboxy, sulfo and hydroxy.

2. A compound of claim 1 of the formula:



3. A compound of claim 1 of the formula:



* * * * *