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Rochester, N.Y.
Continuation-in-part of application Ser. No.
676,603, Oct. 19, 1967, now abandoned.

[54] **DYE DEVELOPER DIFFUSION TRANSFER**
SYSTEMS
20 Claims, No Drawings
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96/76 C, 96/77
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G03c 1/40
[50] **Field of Search**..... **96/29 D, 76**
C, 3

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UNITED STATES PATENTS
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3,262,781 7/1966 Ryan et al. 96/76
3,345,163 10/1967 Land et al. 96/3
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wood Cliffs, N.J.
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ABSTRACT: In dye developer diffusion transfer systems in
which chelatable metal ions are present during processing, the
processing is conducted in the presence of a catechol silver
halide developing agent and a compound which is a more ef-
fective chelating agent for the chelatable metal ions than
catechol.

DYE DEVELOPER DIFFUSION TRANSFER SYSTEMS

This application is a continuation-in-part of Stewart U.S. Pat. application Ser. No. 676,603 filed Oct. 19, 1967, now abandoned, titled "Dye Developer Image Transfer Systems."

The present invention relates to photography, and more particularly to multicolored dye diffusion transfer systems utilizing dye developers.

Color diffusion transfer processes have been described in a number of patents, including British Pat. No. 804,971 published Nov. 26, 1958, U.S. Pat. No. 2,983,606, issued May 9, 1961 and U.S. Pat. No. 3,345,163 issued Oct. 3, 1967. It is known to employ auxiliary developers in dye developer diffusion transfer systems. See U.S. Pat. No. 2,983,606, columns 20-22. Applicant's copending U.S. Pat. application Ser. No. 676,603 filed Oct. 19, 1967, describes the use of catechols as auxiliary developers in dye developer diffusion transfer systems. Although catechols are effective auxiliary developers, it would be highly desirable if means could be provided to increase the efficiency of catechols as auxiliary developers in dye developer diffusion transfer systems.

It is one object of this invention to provide dye developer diffusion transfer processes and products.

It is another object of this invention to provide dye developer diffusion transfer processes wherein the efficiency of catechols as auxiliary developers is increased.

Still another object of this invention is to provide dye developer diffusion transfer processes containing a catechol as auxiliary developer, which products exhibit increased activity by the catechol as auxiliary developer.

A further object of this invention is to provide dye developer diffusion transfer processes and products which yield dye images of good density and color saturation.

Still another object of this invention is to provide dye developer diffusion transfer processes and products which have high maximum densities and low minimum densities.

It is still another object of this invention to provide dye developer diffusion transfer processes and products having high color saturation and low color contamination.

Still other objects of this invention will be apparent from the disclosure herein and the appended claims.

In accordance with this invention, the activity of catechols as auxiliary developers in dye developer diffusion transfer systems is increased by the presence of a compound which is more active chelating agent than the catechol, when processing is conducted in the presence of chelatable metal ions.

In accordance with one embodiment of this invention, an improvement is provided in the process for producing a photographic transfer image in color by processing an imagewise exposed photosensitive element comprising at least one light-sensitive silver halide emulsion layer and a dye developer, which is both a silver halide developing agent and a dye, contiguous to the silver halide of said silver halide emulsion layer; said processing being effected by treating the photographic element with an alkaline solution, developing latent images in the regions of exposure of the silver halide layer and thereby immobilizing dye developer in regions of exposure, dye developer in undeveloped regions diffusing imagewise in register to a dye developer reception layer, the processing being conducted in the presence of chelatable metal ions. The improvement provided by this invention comprises effecting such processing in the presence of (1) a substantially colorless, alkali-soluble catechol as auxiliary silver halide developing agent; and (2) a compound which is more effective chelating agent for said chelatable metal ions than catechol.

In another embodiment of this invention, a photographic product is provided comprising: a photosensitive element comprising a support having coated thereon at least one light-sensitive layer and a dye-developer which is both a silver halide developing agent and a dye contiguous to the silver halide of the silver halide emulsion layer; a dye developer reception layer; and, a rupturable container holding an aqueous alkaline processing solution; the photosensitive element and the dye developer reception layer being capable of being superposed

on each other; the container being so positioned as to be capable, upon being ruptured, of releasing processing solution for application to the superposed photosensitive element and reception layer; the product containing chelatable metal ions so positioned in said product as to be present in the photosensitive element during development; and, said product containing (1) a substantially colorless, alkali-soluble catechol as auxiliary silver halide developing agent, and (2) a compound which is a more effective chelating agent for said chelatable metal ions than catechol, said catechol and said compound being so positioned in said product as to be present in the photosensitive element during processing.

In another embodiment of this invention, an improvement is provided in the processing of an imagewise exposed photographic element comprising a support having coated thereon at least two dye image-forming units with an alkali-permeable, water-insoluble salt stratum positioned between at least two of the dye image-forming units, the dye image-forming units comprising a silver halide emulsion layer and a dye developer contiguous to silver halide of the emulsion, and the salt stratum comprising an alkali-permeable, water-insoluble salt of a polyvalent metal and a film-forming alkali-permeable, water-soluble polymer having free carboxylic acid groups, the salt stratum being less permeable to dye developers comprising said dye image-forming units in aqueous alkaline solution than the water-soluble polymer used to prepare said salt stratum; the processing being effected by treating the photographic element with an alkaline processing liquid, developing latent images in the regions of exposure of the silver halide emulsion layers and thereby immobilizing dye developers in regions of exposure, dye developers in undeveloped regions diffusing imagewise in register to a reception layer for dye developer images. The improvement provided by this embodiment of this invention comprises effecting said processing in the presence of (1) a substantially colorless, alkali-soluble catechol as auxiliary silver halide developing agent; and (2) a compound which is a more effective chelating agent for said polyvalent metal ions than catechol. In another embodiment of this invention, a photographic product is provided comprising: a photosensitive element comprising a support having coated thereon at least two dye image-forming units with an alkali-permeable, water-insoluble salt stratum positioned between at least two of the dye image-forming units, the dye image-forming units comprising a silver halide emulsion layer and a dye developer contiguous to silver halide of the emulsion, and the salt stratum comprising an alkali-permeable, water-insoluble salt of a polyvalent metal and a film-forming, alkali-permeable, water-soluble polymer having free carboxylic acid groups, the salt stratum being less permeable to dye developers comprising the dye image-forming units in aqueous alkaline solution than the water-soluble polymer used to prepare the salt stratum; a dye developer reception layer; and, a rupturable container holding an aqueous alkaline processing solution; the photosensitive element and dye developer reception layer being capable of being superposed on each other; the container being so positioned as to be capable, upon being ruptured, of releasing the processing solution for application to said superposed photosensitive element and reception layer; and, said product containing (1) a substantially colorless alkali-soluble catechol as auxiliary silver halide developing agent, and (2) a compound which is more effective chelating agent for said polyvalent metal ions than the catechol; the catechol and the compound being so positioned in said product as to be present in the photosensitive element during development.

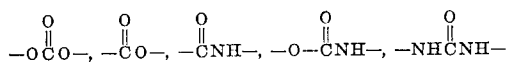
Chelatable metal ions can be introduced into dye developer diffusion transfer systems during processing in a variety of ways. Most commonly, the emulsions employed in the photographic elements utilized in dye developer diffusion transfer systems comprise gelatin which contains varying amounts of alkaline earth ion, generally calcium ion. Calcium ions can be introduced into the emulsion during washing operations, in the preparation of the photographic silver halide emulsions

utilized in the element. Even if a "deashed" gelatin were employed in the initial formation of the silver halide emulsion, the emulsion typically would be washed with water containing alkaline earth ions, such as calcium ions, which would be introduced in the gelatin and retained in the emulsion after coating and formation into the photographic elements of the type utilized in dye developer diffusion transfer systems.

Chelatable metal ions can also be present in the dye developer diffusion transfer element in the form of barrier layers or salt strata of the type described by Becker in U.S. Pat. No. 3,384,483 issued May 21, 1968, the disclosure of which is incorporated herein by reference. Such barrier layers can be prepared with a variety of polyvalent metal salts and polymeric carboxylic acids. The subject salt strata can be formed in the element by coating a solution, on a water-permeable substrate, containing the polyvalent metal in water-soluble form on a polymeric carboxylic acid layer previously coated on the element to form a thin layer of a water-insoluble salt. The polyvalent metal in water-soluble form can be coated directly on silver halide emulsion layers if the vehicle for the silver halide is a polymeric carboxylic acid that forms a water-insoluble salt with the polyvalent metal moiety. Interlayers of water-permeable materials can be utilized on either side of the subject water-insoluble salt strata. Such salt strata are preferably utilized between the magenta and cyan dye image-forming units to particularly improve red purity and saturation of the transferred dye developer images. Similarly, the subject salt strata can be utilized between the yellow and the magenta dye image-forming units as well as between both the magenta and the cyan dye image-forming units to improve color purity and saturation of the transfer dye developer images.

A wide variety of film-forming, alkali-permeable, water-soluble polymeric compositions containing free carboxylic acid groups, and including water-soluble salts thereof, can be utilized to form the barrier layer or salt strata with polyvalent metal moieties. Typically, such polymers contain about 5 percent to 60 percent by weight of polymer of free carboxylic acid groups (i.e., available for reaction with the subject polyvalent metal moieties in aqueous alkaline solutions) or the equivalent weight of water-soluble salts thereof. Typical of such suitable acid polymers include:

1. natural occurring carboxylic acid group-containing polymers and derivatives thereof including such proteins as gelatin, casein and the like,
2. natural occurring high molecular weight carboxylic acid group-containing polysaccharides and derivatives thereof such as alginic acid, pectic acid, tragacanthic acid, carboxymethyl cellulose, and the like, and
3. synthetic linear polymers containing carboxylic acid groups such as addition vinyl polymers and condensation polymers wherein the monomeric repeating units are connected with such groups as $\text{O}-$,



and the like, illustrating of such synthetic polymers are disclosed in U.S. Pat. No. 2,565,418, U.S. Pat. No. 3,062,674, U.S. Pat. No. 3,007,901 and British Pat. No. 886,882 and include succinoylated polyvinyl alcohol, maleic acid-styrene polymers, alkylacrylate-acrylic acid polymers, formaldehyde-salicylic acid polymers, acidic polyesters, acid polyamides and the like.

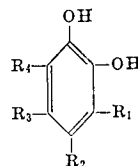
Polyvalent metal moieties are utilized to form the present salts as such moieties can be used to cross-link carboxylic acid moieties of the polymeric carboxylic acid to form the present strata which have the proper degree of alkali permeability and water-insolubility to serve as barrier layers to prevent color contamination and interdevelopment between dye image-forming units. A wide variety of polyvalent metal moieties can be utilized in preparing the subject salt strata. Suitable polyvalent metals with which salt strata can be prepared include alkaline earth metals, such as calcium, barium and strontium, and the like polyvalent metals that form alkali-permeable, water-insoluble salts with the above-described polymeric materials containing carboxylic acid groups.

The amount of polymeric salt utilized in the subject salt strata can be widely varied, the amount varying with the effect desired and the nature of the polyvalent metal and the polymeric carboxylic acid. More generally, the amount of coverage of the polyvalent metal-polymeric carboxylic acid salt stratum utilized is that which is substantially equivalent in permeability to dye developers in aqueous alkaline solution to the calcium alginate formed when a stratum consisting essentially of sodium alginate is reacted with calcium chloride coated thereover at a coverage of about 5 to 100 mg. per square foot.

Typical alkali-permeable water-insoluble salts comprising the barrier layers of the light-sensitive photographic elements used in the invention include:

- strontium gelatinate,
- barium gelatinate,
- calcium pectinate,
- calcium alginate,
- calcium-succinoylated polyvinyl alcohol,
- calcium-polyacrylic acid,
- barium alginate,
- magnesium alginate,
- strontium alginate,
- calcium-condensation of formaldehyde and salicylic acid, and the like, and including mixtures thereof.

Any catechol which is a silver halide developing agent can be used in the practice of this invention. Such catechols chelate chelatable metal ions. Advantageously, the catechol is substantially colorless and is soluble in alkaline solution. The word "catechol" is used generically herein to include 1,2-dihydroxybenzenes, which can contain additional hydroxyl groups such as a 1,2,3-trihydroxybenzene, a 1,2,4-trihydroxybenzene or a 1,2,4,5-tetrahydroxybenzene. Suitable catechols include those having the structural formula:



wherein: R_1 , R_2 , R_3 and R_4 can be hydrogen an alkyl radical, preferably of about one to eight carbon atoms (e.g., methyl, ethyl, propyl, butyl, amyl, hexyl, heptyl, octyl, etc.), an aryl radical (etc., phenyl, tolyl, naphthyl, etc.), hydroxyl, aryloxy such as phenoxy, halogen such as chlorine or bromine, carboxy or R_2 and R_3 or R_3 and R_4 , when taken together with the carbon atoms to which they are attached, represent the atoms to complete a cycloalkyl group containing from four to six carbon atoms (e.g., cyclohexyl, cyclopentyl, etc.) which can contain an endomethylene group (e.g., methanocyclohexyl, methanocyclopentyl, etc.). Salts and esters of these catechols can also be used.

A preferred class of catechols having the aforesaid structural formula are those in which R_1 , R_2 , R_3 and R_4 are either hydrogen or an alkyl radical of from one to eight carbon atoms.

Examples of suitable catechols include:

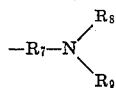
- catechol
- 4-methylcatechol
- 4-isopropylcatechol
- 3-isopropylcatechol
- 4-tert-butylcatechol
- 4-phenylcatechol
- 3,6-dimethylcatechol
- 1,2-dihydroxy-5,8-methano-5,6,7,8-tetrahydronaphthalene
- hexoylcatechol
- 1,2,3-trihydroxybenzene
- 3-phenylcatechol
- 4-octylcatechol
- 1,2,4-trihydroxybenzene

p-chlorocatechol
4,5-dibromocatechol
1,2,4,5-tetrahydroxybenzene
caffeic acid
4-phenoxycatechol

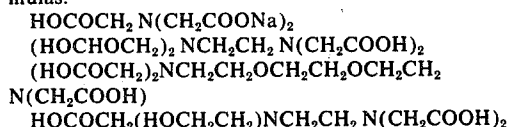
In accordance with the practice of the invention, there is employed in combination with catechol a compound which is a more effective chelating or sequestering agent than catechol for the chelatable metal ions present in the element. An especially preferred class of compound for this purpose is the non-polymeric tertiary amino compounds having at least three carboxyalkyl groups. The most useful tertiary amino compounds have the following formula:



wherein R_5 and R_6 each represents a carboxyalkyl group such as carboxymethyl, 2-carboxyethyl, 2-carboxypropyl, 3-carboxypropyl, 2-carboxybutyl or 4-carboxybutyl; and, Y represents a carboxyalkyl group, such as one described above, or a group having the formula:



wherein R_7 represents an alkylene group, such as methylene, ethylene, propylene or butylene or, R_7 can represent an alkylenebis(oxyalkylene) group such as methylenebis(oxyethylene), ethylenebis(oxyethylene), ethylenebis(oxypropylene), propylenebis(oxybutylene) and the like; R_8 represents a carboxyalkyl group, such as one of those referred to above; and R_9 represents a carboxyalkyl group, such as one of those referred to above, or a hydroxyalkyl group such as hydroxymethyl, 2-hydroxyethyl, 2-hydroxypropyl, 3-hydroxypropyl, 2-hydroxybutyl or 4-hydroxybutyl. Some particularly useful compounds are nitrilotriacetic acid, disodium salt, ethylenediamine tetraacetic acid, [ethylenebis-(oxyethylenenitrilo)]tetraacetic acid or N-(2-hydroxyethyl)-ethylenedinitrilo triacetic acid, which have the following formulas:



The chelatable metal ions can be present during processing at widely varying concentrations. Accordingly, the optimum concentrations for the catechol and more effective chelating compound will vary considerably depending on the concentration of chelatable metal ions present during processing and the effects (particularly auxiliary development activity) desired. Generally speaking, when the chelatable metal ions are present primarily in the gelatin as a result of washing the material with water, or as a salt stratum, good results are achieved when about 1 to about 150 mg. of catechol are employed per square foot when the catechol is used in the light sensitive element; about 50 to 200 mg. of catechol per square foot are used when the catechol is incorporated in the image receiving sheet or layer for dye developers; and, at about 0.1 to 5 percent by weight of the alkaline processing composition when the catechol is utilized therein. Similar concentrations of the compound which is a more effective chelating agent than catechol can be utilized.

As already indicated, the chelatable metal ions can be introduced during processing from sources within the element. The chelatable metal ions can also be introduced from the receiving sheet or the processing material.

The invention can be practiced when the catechol and the more effective chelating or sequestering agent are present in the alkaline processing solution, the receiving sheet or in the element itself. The catechol and the more effective chelating

agent do not need to be together in the product. For example, the catechol can be present in the alkaline processing solution and the more effective chelating compound can be incorporated in the photographic element. In accordance with the preferred embodiments of this invention, however, both the chelating agent and the more active sequestering agent are incorporated in the alkaline processing solution.

Dye developers are well known in the photographic art. Such compounds function both as a silver halide developing agent and as a dye in photographic diffusion transfer systems. Dye developers are characterized as being relatively nondiffusible in colloid layers such as the hydrophilic organic colloids used in photographic emulsions at neutral pH, but diffusible in the photographic elements in the presence of alkaline processing solutions. Generally, such dye developers are substantially insoluble in water, which property usually necessitates the use of organic solvents to incorporate the dye developers into the organic colloid layers of the photoelements. The dye developers are particularly characterized as containing both a chromophoric or dye moiety and at least one moiety having a silver halide developing agent function. Particularly useful dye developers are those wherein the chromophoric moiety is an azo or anthraquinone dye moiety and the silver halide developing moiety is a benzenoid moiety such as a hydroquinonyl moiety.

Representative dye developers of use in the dispersions of the invention have the general formula $M-N=D$ in which M is an aromatic or heterocyclic ring or ring systems such as a benzene, naphthalene, tetralin, anthracene, anthraquinone, pyrazole, quinoline, etc., ring which can be substituted with such groups as hydroxyl, amine, keto, nitro, alkoxy, aryloxy, acyl, alkylamido, alkylaryl, carboxamido, sulfonamide carboxyl or sulfo groups. D represents a silver halide developing agent moiety imparting the developing agent function to the dye developer such as a hydroquinonyl group which can be substituted with amino, alkylamino, alkyl, hydroxyl, alkoxy or halogen groups.

Typical useful dye developers are described in columns 9-13 of U.S. Pat. No. 3,146,102, as well as elsewhere in the patent literature, including: Australian 220,279; German 1,036,640; British 804,971 and 804,973-5; Belgian 554,935; French 1,168,292; and Canadian 577,021 and 579,038.

In the photographic elements of the invention, the dye developers are preferably incorporated in hydrophilic organic colloidal vehicles or carriers comprising the layers of the photographic element dissolved in high-boiling or crystalloidal solvents and dispersed in finely divided droplets. In preparing such dispersions of dye developers, high-boiling or substantially water-immiscible organic liquids having boiling points above about 175° C. are utilized. The high-boiling solvent can be used along in dissolving the dye developer and in forming the dispersion or it can be mixed with a low-boiling organic solvent (e.g., boiling at least 25° C. below the boiling point of the higher boiling solvent), or a water-soluble organic solvent, as an auxiliary solvent to facilitate solution of the dye developer. A preferred range of proportions of high-boiling solvent to auxiliary is 1/0 to 1/10 on a weight basis. Such auxiliary solvents can be readily removed from the high-boiling solvent, for example, by air-drying a chilled, noodled dispersion or by continuous water washing. Several of such high-boiling solvents and auxiliary solvents utilized for incorporating dye developers are described in French Pat. No. 1,313,765. The dye developers can also be incorporated into vehicles soluble in organic solvents which are also solvents for the dye developer. Likewise, other incorporating techniques for the dye developer such as ball-milling can be utilized.

The photographic elements of the invention desirably contain auxiliary developing agents, in addition to catechols, such as colorless substantially water-insoluble hydroquinone derivatives, e.g., those disclosed in French Pat. No. 1,313,086. Such auxiliary developing agents can be incorporated in the silver halide emulsion layers, in overcoat layers, in interlayers or in other layers of the element.

The silver halide emulsions utilized in preparing the photographic elements of the invention are more generally the con-

ventional negative-type, developing-out emulsions, positive transfer images resulting from such emulsions. However, reversal emulsions such as solarized emulsions and emulsions that form latent images predominantly internal to the silver halide grains as described in U.S. Pat. No. 2,592,250, can also be used, negative transfer images resulting from such emulsions. Typical suitable silver halides include silver chloride, silver bromide, silver bromoiodine, silver chloroiodide, silver chlorobromoiodide, etc. Useful sensitizers are those in Kennard Ser. No. 377,792, filed Jan. 15, 1964. Mixtures of more than one of such silver halides can also be utilized. In preparing such silver halide emulsions, a wide variety of hydrophilic organic colloids can be utilized as the vehicle or carrier. I prefer to utilize gelatin as the hydrophilic colloid or carrier material although such material as polyvinyl alcohol and its water-soluble derivatives and copolymers, water-soluble copolymers such as polyacrylamide, imidized polyacrylamide, etc., or polymerized vinyl compounds such as those disclosed in U.S. Pat. Nos. 3,142,586, 3,193,386, 3,062,674 and 3,220,844 and including the water-insoluble polymers of alkyl acrylates and methacrylates, acrylic acid, sulfoalkyl acrylates or methacrylates and the like.

In the present photographic elements, the dye developers are disposed integral with the element and contiguous to silver halide of each of the light-sensitive silver halide emulsion layers. Such dye developers can be incorporated directly in the light-sensitive silver halide emulsion layers or in separate layers contiguous to the layers containing the silver halide. The present photographic elements contain at least two dye image-forming units, each unit comprising a light-sensitive silver halide emulsion and a dye developer contiguous to silver halide in the unit. Each dye image-forming unit is preferably spectrally sensitized to record light that is substantially complementary to the color of the dye developer in the unit.

The various layers utilized in preparing the present photographic elements can be coated on a wide variety of transparent and opaque photographic supports. Typical supports include cellulose nitrate film, cellulose acetate film, polyvinyl acetal film polystyrene film polyethylene terephthalate film, polyethylene film, polypropylene film, paper, polyethylene-coated paper, glass.

A wide variety of receiving sheets can be utilized to receive the dye developer images from the present light-sensitive photographic elements. The sequestering agents used in the invention can be positioned in any of the layers of the receiving sheet. Typical reception layers for dye developer receiving sheets which are, or include, mordants for dye developers, are such materials as linear polyamides, proteins such as gelatin, polyvinyl pyrrolidones, poly-4-vinyl pyridine, polyvinyl alcohol, polyvinyl salicylal, partially hydrolyzed polyvinyl acetate, methyl cellulose, regenerated cellulose, carboxymethyl cellulose and hydroxyethyl cellulose, or mixtures of such. These reception layers can be coated on a suitable support of the type described above for the light-sensitive elements of the invention and including transparent as well as opaque supports. Also, receiving sheets that release acidic material such as that derived from an acidic polymer or other acidic compound at a controlled rate are as described in U.S. Pat. No. 2,584,030 are particularly useful. Such acidic materials are typically positioned in layers on the receiving sheet below the dye developer reception layer, there suitably being a spacer layer between the acid layer and the mordanting layer to control the release of acidic material. Such acidic materials serve to neutralize residual portions of the alkaline activator on the receiving sheet. A wide variety of nondiffusible cationic or basic dye-mordanting compounds can be used in liquid permeable reception layers including amines such as polymeric amines, quaternary ammonium compounds, quaternary phosphonium compounds and tertiary sulfonium compounds. Such mordants are nondiffusible in the alkaline processing composition and contain at least one hydrophobic ballast group.

To facilitate a clean stripping away of the receiving sheet from the negative element after the transfer of the dye

developer images to the receiving sheet, the receiving sheet can be prepared by superficially hardening with a nondiffusing hardener and a surfactant. For example, a dye developer image receiving layer on a receiving sheet containing poly-4-vinyl pyridine mordant in polyvinyl alcohol can be efficaciously treated with an oxyguar gum hardener solution containing a surfactant such as sodium cetyl sulfate or sodium N-methyl-N-oleoyl taurate.

Light-sensitive elements containing integral reception layers for dye developer images can also be utilized. Such integral reception layers can be coated beneath the emulsion and dye developer layers near the support. A stripping layer coated over the integral reception layer can be used to facilitate the removal of the overcoated layers after the diffusion of the dye developer images to the reception layer.

The processing compositions or activators used to initiate development of the exposed light-sensitive elements of the invention are strongly alkaline. Such processing compositions generally have a pH of at least about 12 or contain a least 0.01 N hydroxyl ion. Alkali metal hydroxides, such as sodium hydroxide, and potassium hydroxide, are advantageously used in the composition for imparting such high alkalinity. However, volatile amines such as diethyl amine can also be used, such amines having the advantage of being volatilized from the prints to leave no residue of alkali. Such processing compositions are generally aqueous liquids or solutions, and when utilized in rupturable pods for in-camera processing, generally contain thickening agents such as hydroxyethyl cellulose, particularly as described in U.S. Pat. No. 3,266,894, or carboxymethyl cellulose. Onium compounds such as are disclosed in U.S. Pat. No. 3,146,102 are preferably utilized in the alkaline processing composition. The described sequestering agents can also be utilized in the alkaline processing compositions used in the processes of the invention.

Camera apparatus of the type useful for exposing and processing the sensitive elements of the invention have been described, for example, in U.S. Pat. No. 2,435,717. The processing of the subject photographic elements can also be effected outside of camera apparatus by imbibing either the receiving element or the negative element or both in the alkaline processing composition, and thereafter sandwiching together the two element to allow the dye developer images to diffuse to the receiving element.

In accordance with usual practice, the positioning of the dye image-forming units of the photographic elements of the invention can be varied. In three-color systems, it is preferred to utilize the cyan dye image-forming unit most proximate to the support, the yellow dye-forming unit furthest from the support, and the magenta dye image-forming unit between the cyan and yellow dye image-forming units. It is also preferred to utilize the dye developers in the respective dye image-forming units in a separate underlying layer contiguous to the silver halide emulsion layer. Likewise, it is preferred to utilize in each dye image-forming unit a dye developer that is substantially complementary in color to the color of light recorded by the silver halide in the unit.

The following examples are included for a further understanding of the invention:

Examples 1-4

A photographic element, element 1, is prepared by coating successively the following layers on a subbed cellulose acetate film support:

Layer No.

1. Cyan Dye Developer Layer

A coating of the cyan dye developer, 5,8-dihydroxy-1,4-bis[(β -hydroquinonyl- α -methyl)ethylamino]-anthraquinone, dissolved in N-n-butylacetanilide, dispersed in gelatin and coated on the support.

2. Red-Sensitive Emulsion Layer

A coating of a developing-out negative gelatino-silver bromoiodide emulsion sensitized to red light coated at a coverage of about 180 mg. of silver per square foot.

3. Gelatin Layer

A gelatin layer is coated over the red-sensitive emulsion layer.

4. Magenta Dye Developer Layer

A coating of the magenta dye developer, 4-isopropoxy-2-[p-(β -hydroquinonyl)ethyl]-phenylazo]-1-naphthol, dissolved in N-n-butylacetanilide dispersed in gelatin.

5. Green-Sensitive Emulsion Layer

A coating of a developing-out negative gelatino-silver bromoiodide emulsion sensitized to green light is then coated at a coverage of about 110 mg. of silver per square foot.

6. Interlayer

A gelatin layer is coated over layer 5.

7. Yellow Dye Developer Layer

A coating of the yellow dye developer, 1-phenyl-3-N-n-hexylcarboxamide-4-[p-(2',5'-dihydroxyphenethyl)-phenylazo]-5-pyrazolone, dissolved in ditetrahydrofurfuryl adipate and dispersed in gelatin.

8. Blue-Sensitive Emulsion Layer

A developing-out negative gelatino-silver bromoiodide emulsion that is inherently sensitive to blue light is coated at a coverage of about 70 mg. of silver per square foot.

9. Overcoat Layer

A gelatin layer is coated over layer 10.

The gelatin layers of the above photographic element contains calcium ions as a result of washing the emulsion with water. The photographic element obtained is exposed through a 0.3 density increment color step wedge in an intensity scale sensitometer 1/50 inch to a 500-watt positive lamp using a blue colored filter that absorbs some red light to convert the tungsten exposure to daylight color balance. Separate samples of the exposed element are treated with a solution of acetonitrile and others with a solution of acetonitrile containing a catechol. The acetonitrile solution is spread evenly over the surface of the element, and solutions containing catechol (4-methylphenyl catechol) are treated to provide a coverage of about 0.64 millimoles catechol per square foot. The samples are then processed with a processing solution disposed in a processing pod and having a composition like that described by Land in example 7 of U.S. Pat. No. 3,362,821 issued Jan. 9, 1968. Certain processing solutions contain 3.65 grams of ethylenediaminetetraacetic acid (EDTA) per kilogram of processing solution. The exposed film is processed at a gap of 0.004 inch (corresponding to the thickness of the activator layer) for a period of 60 seconds in contact with a color receiving sheet. The receiving sheet is a cellulose acetate butyrate subbed paper support carrying in the following order:

1. a polymeric acid layer for pH control,
2. a polyvinyl alcohol spacer layer
3. a mordant layer comprising poly-4-vinyl pyridine and polyvinyl alcohol, and
4. a polyvinyl alcohol protective layer.

The reflection densities of the graduated scales of the transferred dye images on the receiving sheets are determined. Table A below shows the neutral scale maximum density and minimum density for the red (cyan dye developer), green (magenta dye developer) and blue (yellow dye developer). The results are shown below:

TABLE A

Print neutral scale							
	D _{max.}			D _{min.}			Remarks
	R	G	B	R	G	B	
1.....	1.11	1.61	1.92	.35	.66	.69	Negative treated with acetonitrile-control.
2.....	1.24	1.59	1.88	.38	.56	.55	Negative treated with acetonitrile-and-EDTA activator used for processing.
3.....	1.13	1.55	1.79	.25	.46	.50	Same as 1 but 0.4 m. 4-phenyl-catechol in acetonitrile.
4.....	1.36	1.65	1.98	.21	.30	.28	Same as 2 but 0.4 m. 4-phenyl-catechol in acetonitrile.

The results in the above table demonstrate that the combination of a catechol together with a more active chelating agent effectively increases the developed dye densities, and also results in lower minimum densities, than color control elements containing the catechol alone or the more active sequestering agent along. It is believed that the chelating agent ties up some of the calcium present during processing, thus allowing the catechol (which also functions as chelater for metal ions) to exercise more efficient auxiliary developing action. Improved print quality is apparent even when the more active sequestering agent is employed along. The active chelating agent may function to increase the developing rate of dye developers employed in the dye developer system, thus accounting for the improved print quality when this material is used without catechol. Essentially similar results to those in example 4 are obtained when the catechol is incorporated in a layer in the receiving sheet or when it is incorporated in the alkaline processing solution, and when the more active sequestering agent is employed in the receiving sheet or in the alkaline processing solution. Slightly superior results are obtained when both catechol and alkaline processing solution are both incorporated in the alkaline processing solution. Results generally similar to those in example 4 are obtained when the photographic element contains a calcium alginate barrier layer (prepared as described in Becker U.S. Pat. No. 3,384,483 issued May 21, 1968) between layers 3 and 4 and layers 6 and 7.

The invention has been described in detail with particular reference to preferred embodiments thereof, but, it will be understood that variations and modifications can be effected within the spirit and scope of the invention.

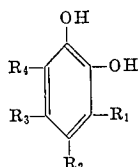
I claim:

1. In a process for producing a photographic transfer image in color which comprises processing an imagewise exposed photosensitive element comprising at least one light-sensitive silver halide emulsion layer and a dye developer, which is both a silver halide developing agent and a dye, contiguous to the silver halide of said silver halide emulsion layer; said processing being effected by treating said photographic element with an alkaline solution, developing latent images in the regions of exposure of said silver halide layer and thereby immobilizing dye developer in said regions of exposure, dye developer in undeveloped regions diffusing imagewise in register to a dye developer reception layer, and said processing being conducted in the presence of chelatable metal ions: the improvement which comprises effecting said processing in the presence of (1) a substantially colorless, alkali-soluble catechol as auxiliary silver halide developing agent; and (2) a compound which is more effective chelating agent for said chelatable metal ions than catechol.

2. In a process for producing a photographic transfer image in color which comprises processing an imagewise exposed photosensitive element comprising a plurality of light-sensitive silver halide emulsion layers sensitive to light of different regions of the spectrum, and a dye developer, which is both a silver halide developing agent and a dye, contiguous to the silver halide of said silver halide emulsion layers; said processing being effected by treating said photographic element with an alkaline solution, developing latent images in the regions of exposure of said silver halide layers and thereby immobilizing dye developer in said regions of exposure, dye developer in undeveloped regions diffusing imagewise in register to a dye developer reception layer, and said processing being conducted in the presence of chelatable metal ions: the improvement which comprises effecting said processing in the presence of (1) a substantially colorless, alkali-soluble catechol as auxiliary silver halide developing agent; and (2) a nonpolymeric tertiary amino compound having at least three carboxyalkyl groups and salts thereof, which tertiary amino compound is more effective chelating agent for said chelatable metal ions than said catechol.

3. In a process for producing a photographic transfer image in color which comprises processing an imagewise exposed photosensitive element comprising a plurality of light-sensitive

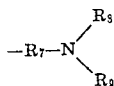
silver halide emulsion layers sensitive to light of different regions of the spectrum, and a dye developer, which is both a silver halide developing agent and a dye, contiguous to the silver halide of said silver halide emulsion layers; said processing being effected by treating said photographic element with an alkaline solution, developing latent images in the regions of exposure of said silver halide layers and thereby immobilizing dye developer in said regions of exposure, dye developer in undeveloped regions diffusing imagewise in register to a dye developer reception layer, and said processing being conducted in the presence of chelatable metal ions: the improvement which comprises effecting said processing in the presence of (1) a substantially colorless, alkali-soluble catechol as auxiliary silver halide developing agent, said catechol having the formula:



wherein R_1 , R_2 , R_3 and R_4 are each selected from the group consisting of hydrogen, hydroxyl, halogen, carboxy, aryloxy, alkyl, aryl and R_2 and R_3 or R_3 and R_4 , when taken together with the carbon atoms to which they are attached, represent the atoms to complete a cycloalkyl group; and (2) a tertiary amino compound which has the following formula:



wherein R_5 and R_6 each represents a carboxyalkyl group; and, Y represents a member selected from the group consisting of a carboxyalkyl group and a group having the formula



wherein R_7 represents a member selected from the group consisting of an alkylene group and an alkylenebis(oxyalkylene) group; R_8 represents a carboxyalkyl group; and, R_9 represents a member selected from the group consisting of a carboxyalkyl group and a hydroxy-substituted alkyl group.

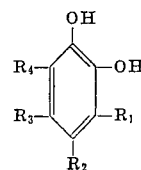
4. In a process for producing a photographic transfer image in color which comprises processing an imagewise exposed photosensitive element comprising a plurality of light-sensitive silver halide emulsion layers sensitive to light of different regions of the spectrum, and a dye developer, which is both a silver halide developing agent and a dye, contiguous to the silver halide of said silver halide emulsion layers; said processing being effected by treating said photographic element with an alkaline solution, developing latent images in the regions of exposure of said silver halide layers and thereby immobilizing dye developer in said regions of exposure, dye developer in undeveloped regions diffusing imagewise in register to a dye developer reception layer, and said processing being conducted in the presence of alkaline earth ions: the improvement which comprises effecting said processing in the presence of (1) 4-phenylcatechol as auxiliary silver halide developing agent; and, (2) a sufficient amount of ethylenediamine tetraacetic acid to effectively increase the silver halide developing activity of the 4-phenylcatechol.

5. A photographic product comprising: a photosensitive element comprising a support having coated thereon at least one light-sensitive layer and a dye-developer which is both a silver halide developing agent and a dye contiguous to the silver halide of said silver halide emulsion layer; a dye developer reception layer; and, a rupturable container holding an aqueous alkaline processing solution; said photosensitive element and said dye developer reception layer being capable of being superposed on each other; said container being so positioned as to be capable, upon being ruptured, of releasing said processing solution for application to said superposed photosensitive element and reception layer; said product containing chelatable metal ions so positioned in said product as to be present in the photosensitive element during development; and, said product containing (1) a substantially colorless, alkali-soluble catechol as auxiliary silver halide developing agent, said catechol having the formula:

perposed on each other; said container being so positioned as to be capable, upon being ruptured, of releasing said processing solution or application to said superposed photosensitive element and reception layer; said product containing chelatable metal ions so positioned in said product as to be present in the photosensitive element during development; and, said product containing (1) a substantially colorless, alkali-soluble catechol as auxiliary silver halide developing agent, and (2) a compound which is a more effective chelating agent for said chelatable metal ions than catechol, said catechol and said compound being so positioned in said product as to be present in the photosensitive element during processing.

6. A photographic product comprising: a photosensitive element comprising a support having coated thereon a plurality of light-sensitive layers sensitive to light of different regions of the spectrum, and a dye developer which is both a silver halide developing agent and a dye contiguous to the silver halide of said silver halide emulsion layers; a dye developer reception layer; and, a rupturable container holding an aqueous alkaline processing solution; said photosensitive element and said dye developer reception layer being capable of being superposed on each other; said container being so positioned as to be capable, upon being ruptured, of releasing said processing solution for application to said superposed photosensitive element and reception layer; said product containing chelatable metal ions so positioned in said product as to be present in the photosensitive element during development; and, said product containing (1) a substantially colorless, alkali-soluble catechol as auxiliary silver halide developing agent; and (2) a non-polymeric tertiary amino compound having at least three carboxyalkyl groups, and salts thereof, which tertiary amino compound is a more effective chelating agent for said chelatable metal ions than said catechol, said catechol and said tertiary amino compound being so positioned in said product as to be present in the photosensitive element during processing.

7. A photographic product comprising: a photosensitive element comprising a plurality of light-sensitive layers sensitive to light of different regions of the spectrum, and a dye developer which is both a silver halide developing agent and a dye contiguous to the silver halide of said silver halide emulsion layers; a dye developer reception layer; and, a rupturable container holding an aqueous alkaline processing solution; said photosensitive element and said dye developer reception layer being capable of being superposed on each other; said container being so positioned as to be capable, upon being ruptured, of releasing said processing solution for application to said superposed photosensitive element and reception layer; said product containing chelatable metal ions so positioned in said product as to be present in the photosensitive element during development; and, said product containing (1) a substantially colorless, alkali-soluble catechol as auxiliary silver halide developing agent, said catechol having the formula:

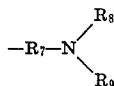


wherein R_1 , R_2 , R_3 and R_4 are each selected from the group consisting of hydrogen, hydroxyl, halogen, carboxy, aryloxy, alkyl, aryl and R_2 and R_3 or R_3 and R_4 , when taken together with the carbon atoms to which they are attached, represent the atoms to complete a cycloalkyl group; and, (2) a tertiary amino compound which has the following formula:



wherein R_5 and R_6 each represents a carboxyalkyl group; and,

Y represents a member selected from the group consisting of a carboxyalkyl group and a group having the formula



wherein R_7 represents a member selected from the group consisting of an alkylene group and an alkylenebis(oxyalkylene) group; R_8 represents a carboxyalkyl group; and, R_9 represents a member selected from the group consisting of a carboxyalkyl group and a hydroxy-substituted alkyl group, said catechol and said tertiary amino compound being so positioned in said product as to be present in the photosensitive element during processing.

8. A photographic product comprising: a photosensitive element comprising a plurality of light-sensitive layers sensitive to light of different regions of the spectrum, and a dye developer which is both a silver halide developing agent and a dye contiguous to the silver halide of said silver halide emulsion layers; a dye developer reception layer; and, a rupturable container holding an aqueous alkaline processing solution; said photosensitive element and said dye developer reception layer being capable of being superposed on each other; said container being so positioned as to be capable, upon being ruptured, of releasing said processing solution for application to said superposed photosensitive element and reception layer; said product containing chelatable metal ions so positioned in said product as to be present in the photosensitive element during development; and, said element containing (1) 4-phenylcatechol as auxiliary silver halide developing agent; and, (2) a sufficient amount of ethylenediamine tetraacetic acid to effectively increase the silver halide developing activity of the 4-phenylcatechol.

9. In the processing of an imagewise exposed photographic element comprising a support having coated thereon at least two dye image-forming units with an alkali-permeable, water-insoluble salt stratum positioned between at least two of said dye image-forming units, said dye image-forming units comprising a silver halide emulsion layer and a dye developer contiguous to silver halide of said emulsion, and said salt stratum comprising an alkali-permeable, water-insoluble salt of a polyvalent metal and a film-forming alkali-permeable, water-soluble polymer having free carboxylic acid groups, said salt stratum being less permeable to dye developers comprising said dye image-forming units in aqueous alkaline solution than said water-soluble polymer used to prepare said salt stratum; said processing being effected by treating the photographic element with an alkaline processing liquid, developing latent images in the regions of exposure of the silver halide emulsion layers and thereby immobilizing dye developers in said regions of exposure, dye developers in undeveloped regions diffusing imagewise in register to a reception layer for dye developer images: the improvement which comprises effecting said processing in the presence of (1) a substantially colorless, alkali-soluble catechol as auxiliary silver halide developing agent; and (2) a compound which is more effective chelating agent for said polyvalent metal ions than catechol.

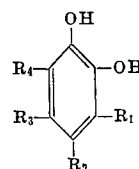
10. The process as defined in claim 9 wherein said catechol and said chelating agent are present in said alkaline processing liquid.

11. In the processing of an imagewise exposed photographic element comprising a support having coated thereon at least two dye image-forming units with an alkali-permeable, water-insoluble salt stratum positioned between at least two of said dye image-forming units, said dye image-forming units comprising a silver halide emulsion layer and a dye developer contiguous to silver halide of said emulsion, and said salt stratum comprising an alkali-permeable, water-insoluble salt of an alkaline earth metal and a film-forming alkali-permeable, water-soluble polymer having free carboxylic acid groups, said salt stratum being less permeable to dye developers comprising

said dye image-forming units in aqueous alkaline solution than said water-soluble polymer used to prepare said salt stratum; said processing being effected by treating the photographic element with an alkaline processing liquid, developing latent images in the regions of exposure of the silver halide emulsion layers and thereby immobilizing dye developers in said regions of exposure, dye developers in undeveloped regions diffusing imagewise in register to a reception layer for dye developer images: the improvement which comprises effecting said processing in the presence of (1) a substantially colorless, alkali-soluble catechol as auxiliary silver halide developing agent; and (2) a nonpolymeric tertiary amino compound having at least three carboxyalkyl groups and salts thereof, which tertiary amino compound is more effective chelating agent for said alkaline earth metal ions than said catechol.

12. The process as defined in claim 11 wherein said catechol and said tertiary amino compound are present in said alkaline processing liquid.

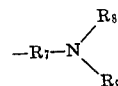
13. In the processing of an imagewise exposed photographic element comprising a support having coated thereon at least two dye image-forming units with an alkali-permeable water-insoluble salt stratum positioned between at least two of said dye image-forming units, said dye image-forming units comprising a silver halide emulsion layer and a dye developer contiguous to silver halide of said emulsion, and said salt stratum comprising an alkali-permeable, water-insoluble salt of an alkaline earth metal and a film-forming alkali-permeable, water-soluble polymer having free carboxylic acid groups, said salt stratum being less permeable to dye developers comprising said dye image-forming units in aqueous alkaline solution than said water-soluble polymer used to prepare said salt stratum; said processing being effected by treating the photographic element with an alkaline processing liquid, developing latent images in the regions of exposure of the silver halide emulsion layers and thereby immobilizing dye developers in said regions of exposure, dye developers in undeveloped regions diffusing imagewise in register to a reception layer for dye developer images: the improvement which comprises effecting said processing in the presence of (1) a substantially colorless, alkali-soluble catechol as auxiliary silver halide developing agent, said catechol having the formula:



wherein R_1 , R_2 , R_3 and R_4 are each selected from the group consisting of hydrogen, hydroxyl, halogen, carboxy, aryloxy, alkyl, aryl and R_2 and R_3 or R_3 and R_4 , when taken together with the carbon atoms to which they are attached, represent the atoms to complete a cycloalkyl group; and (2) a tertiary amino compound which has the following formula:



wherein R_5 and R_6 each represents a carboxyalkyl group; and, Y represents a member selected from the group consisting of a carboxyalkyl group and a group having the formula



wherein R_7 represents a member selected from the group consisting of an alkylene group and an alkylenebis(oxyalkylene) group; R_8 represents a carboxyalkyl group; and, R_9 represents a member selected from the group consisting of a carboxyalkyl group and a hydroxy-substituted alkyl group.

14. The process as defined in claim 13 wherein said catechol and said tertiary amino compound are present in said alkaline processing liquid.

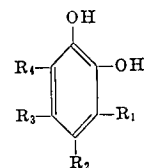
15. In the processing of an imagewise exposed photographic element comprising a support having coated thereon at least two dye image-forming units with an alkali-permeable, water-insoluble calcium alginate salt stratum positioned between at least two of said dye image-forming units, said dye image-forming units comprising a silver halide emulsion layer and a dye developer contiguous to silver halide of said emulsion; said processing being effected by treating the photographic element with an alkaline processing liquid, developing latent images in the regions of exposure of the silver halide emulsion layers and thereby immobilizing dye developers in said regions of exposure, dye developers in undeveloped regions diffusing imagewise in register to a reception layer for dye developer images: the improvement which comprises effecting said processing in the presence of (1) 4-phenylcatechol as auxiliary silver halide developing agent; and, (2) a sufficient amount of ethylenediamine tetraacetic acid to effectively increase the silver halide developing activity of the 4-phenylcatechol; said 4-phenylcatechol and said ethylenediamine tetraacetic acid being present in said alkaline processing liquid.

16. A photographic product comprising: a photosensitive element comprising a support having coated thereon at least two dye image-forming units with an alkali-permeable, water-insoluble salt stratum positioned between at least two of said dye image-forming units, said dye image-forming units comprising a silver halide emulsion layer and a dye developer contiguous to silver halide to said emulsion, and said salt stratum comprising an alkali-permeable, water-insoluble salt of a polyvalent metal and a film-forming, alkali-permeable, water-soluble polymer having free carboxylic acid groups, said salt stratum being less permeable to dye developers comprising said dye image-forming units in aqueous alkaline solution than said water-soluble polymer used to prepare said salt stratum; a dye developer reception layer; and, a rupturable container holding an aqueous alkaline processing solution; said photosensitive element and said dye developer reception layer being capable of being superposed on each other; said container being so positioned as to be capable, upon being ruptured, of releasing said processing solution for application to said superposed photosensitive element and reception layer; and, said product containing (1) a substantially colorless, alkali-soluble catechol as auxiliary silver halide developing agent, and (2) a compound which is more effective chelating agent for said polyvalent metal ions than said catechol; said catechol and said compound being so positioned in said product as to be present in the photosensitive element during development.

17. A photographic product comprising: a photosensitive element comprising a support having coated thereon at least two dye image-forming units with an alkali-permeable, water-insoluble salt stratum positioned between at least two of said dye image-forming units, said dye image-forming units comprising a silver halide emulsion layer and a dye developer contiguous to silver halide of said emulsion, and said salt stratum comprising an alkali-permeable, water-insoluble salt of an alkaline earth metal and a film-forming, alkali-permeable, water-soluble polymer having free carboxylic acid groups, said salt stratum being less permeable to dye developers comprising said dye image-forming units in aqueous alkaline solution than said water-soluble polymer used to prepare said salt stratum; a dye developer reception layer; and, a rupturable container holding an aqueous alkaline processing solution, said photosensitive element and said dye developer reception layer being capable of being superposed on each other; said container being so positioned as to be capable, upon being ruptured, of releasing said processing solution for application to said superposed photosensitive element and reception layer; and, said product containing (1) a substantially colorless, alkali-soluble catechol as auxiliary silver halide developing agent; and (2) a nonpolymeric tertiary amino compound

having at least three carboxyalkyl groups, and salts thereof, which tertiary amino compound is more effective chelating agent for said alkaline earth metal than said catechol; said catechol and said tertiary amino compound being so positioned in said product as to be present in the photosensitive element during development.

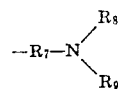
18. A photographic product comprising: a photosensitive element comprising a support having coated thereon at least two dye image-forming units with an alkali-permeable water-insoluble salt stratum positioned between at least two of said dye image-forming units said dye image-forming units comprising a silver halide emulsion layer and a dye developer contiguous to silver halide of said emulsion, and said salt stratum comprising an alkali-permeable, water-insoluble salt of an alkaline earth metal and a film-forming, alkali-permeable, water-soluble polymer having free carboxylic acid groups, said salt stratum being less permeable to dye developers comprising said dye image-forming units in aqueous alkaline solution than said water-soluble polymer used to prepare said salt stratum; a dye developer reception layer; and, a rupturable container holding an aqueous alkaline processing solution; said photosensitive element and said dye developer reception layer being capable of being superposed on each other; said container being so positioned as to be capable, upon being ruptured, of releasing said processing solution for application to said superposed photosensitive element and reception layer; and, said product containing (1) a substantially colorless, alkali-soluble catechol as auxiliary silver halide developing agent, said catechol having the formula:



wherein R_1 , R_2 , R_3 and R_4 are each selected from the group consisting of hydrogen, hydroxyl, halogen, carboxy, aryloxy, alkyl, aryl and R_2 and R_3 or R_3 and R_4 , when taken together with the carbon atoms to which they are attached, represent the atoms to complete a cycloalkyl group; and, (2) a tertiary amino compound which has the following formula:



wherein R_5 and R_6 each represents a carboxyalkyl group; and, Y represents a member selected from the group consisting or a carboxyalkyl group and a group having the formula



wherein R_7 represents a member selected from the group consisting of an alkylene group and an alkylenebis(oxyalkylene) group; R_8 represents a carboxyalkyl group; and, R_9 represents a member selected from the group consisting of a carboxyalkyl group and, a hydroxy-substituted alkyl group, said catechol and said tertiary amino compound being so positioned in said product as to be present in the photosensitive element during development.

19. A photographic product as defined in claim 18 wherein said catechol and said tertiary amino compound are present in said rupturable container.

20. A photographic product comprising: a photosensitive element comprising a support having coated thereon at least two dye image-forming units with an alkali-permeable, water-insoluble calcium alginate salt stratum positioned between at least two of said dye image-forming units, said dye image-forming units comprising a silver halide emulsion layer and a

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dye developer contiguous to silver halide of said emulsion; a dye developer reception layer; and, a rupturable container holding an aqueous alkaline processing solution; said photosensitive element and said dye developer reception layer being capable of being superposed on each other; said container being so positioned as to be capable, upon being ruptured, of releasing said processing solution for application to

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said superposed photosensitive element and reception layer; and, said product containing (1) 4-phenylcatechol as auxiliary silver halide developing agent; and, (2) a sufficient amount of ethylenediamine tetraacetic acid to effectively increase the silver halide developing activity of the 4-phenylcatechol said 4-phenylcatechol and said ethylenediamine tetraacetic acid being present in said rupturable container.

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