

3,362,822

FILM FORMATION IN SILVER AND COLOR DIFFUSION TRANSFER PROCESSES

Howard C. Haas, Arlington, Howard G. Rogers, Weston,
and Lloyd D. Taylor, Everett, Mass., assignors to
Polaroid Corporation, Cambridge, Mass., a corporation
of Delaware

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The present invention is concerned with photography and, more particularly, with diffusion transfer processes.

The present invention is especially related to silver and color diffusion transfer processes of the type wherein a transfer image is obtained in a single step by treating an exposed photosensitive element with a layer of a suitable processing solution to provide, as a function of development, an imagewise distribution of image-forming components, and transferring the imagewise distribution of image-forming components through the layer of processing solution to a superposed image-receiving element to form a transfer image thereon.

In diffusion processes of the silver transfer type, an exposed photosensitive silver halide emulsion is developed and almost concurrently therewith a soluble silver complex is obtained by reaction of a silver halide solvent with the unexposed and undeveloped silver halide of said emulsion. Preferably, the photosensitive silver halide emulsion is wet with a layer of processing composition which is spread between a photosensitive element comprising the silver halide emulsion and a print-receiving element. The processing composition effects development of the latent image in the emulsion and substantially contemporaneous therewith forms a soluble silver complex, for example, a thiosulfate or thiocyanate, with undeveloped silver halide. This soluble silver complex is, at least in part, transported in the direction of the print-receiving element and the silver thereof is largely precipitated thereon to form a positive transfer image.

In color diffusion transfer processes a photosensitive element including a silver halide emulsion layer is exposed to create therein a latent image. The latent image is developed and, concurrent with and under the control of this development, an imagewise distribution of mobile color-providing substances is formed. At least a portion of these color-providing substances is transferred through the processing liquid to the superposed image-receiving layer to form a colored image thereon. As examples of such processes, mention may be made of the processes disclosed and claimed in U.S. Patent No. 2,983,606, wherein dye developers (i.e., compounds which contain in the same molecule both the chromophoric system of a dye and also a silver halide developing function) are the color-providing substances, the processes disclosed and claimed in U.S. Patent No. 2,647,049, issued July 28, 1953, to Edwin H. Land, wherein color developers are employed to develop the latent image and color couplers are the color-providing substances, and the processes disclosed in U.S. Patent No. 2,774,668, issued Dec. 18, 1956, to Howard G. Rogers, wherein complete, performed dyes are used as the color-providing substances.

In the most commonly employed method for carrying out such processes, a layer of the processing solution is applied between the photosensitive element and a superposed image-receiving element, and the imagewise distribution of image-forming components is transferred through the layer of processing solution to the image-receiving layer. In preferred embodiments, the processing solution comprises a film-forming, viscosity-increasing reagent, such, for example, as hydroxyethyl cellulose or sodium carboxymethyl cellulose to facilitate the spreading

of the solution, between the photosensitive element and the image-receiving element. As can be appreciated, not all of the imagewise distribution of image-forming components reaches the image-receiving layer and a certain portion of it remains imagewise distributed in the processing solution. It has been proposed that the image-forming components remaining in the film of processing solution may be used to enhance the density of the transfer image by having the film of processing solution preferably adhere to the image-receiving element when it is separated from the photosensitive element. Although this proposal has been carried out successfully, its widespread adoption has been hindered by the fact that the transfer images cannot be handled for considerable periods until the processing solution sets. The present invention is concerned with providing means for substantially cutting down the time which the layer of processing solution takes to set on the image-receiving element. It is particularly useful when it is employed with image-receiving elements which have means therein for reducing the alkalinity of the processing solution, such as disclosed in the copending application of Edwin H. Land, Ser. No. 234,864, filed Nov. 1, 1962.

One object of the present invention is to provide in diffusion transfer processes means for accelerating the setting times of layers of processing solution which are interspersed between a photosensitive element and an image-receiving element during processing and which are adapted to preferentially adhere to the image-receiving element when said elements are separated.

Another object of the present invention is to provide processing solutions for diffusion transfer processes comprising means therein for accelerating the setting time of said processing solution.

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

The invention accordingly comprises the process involving the several steps and the relation and order of one or more of such steps with respect to each of the others, and the product 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.

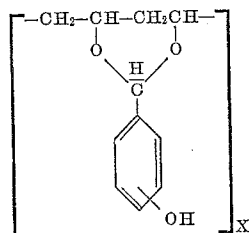
It has been found in the present invention that the setting time of the film of processing solution on image-receiving elements, and especially on image-receiving elements having means therein for reducing the alkalinity of the processing solution, may be substantially reduced by incorporating in the processing solution a polymeric substance which is soluble in strongly alkaline solutions, e.g., solutions having pH's greater than 11.0, and particularly a pH between 12 and 14, but is insoluble and precipitates out when the pH's reduced to 7 to 11.0 and, more preferably, 9 to 11.

The preferred polymeric materials for use in the present invention are those which, in addition to possessing the above solubility characteristics, are (1) stable in the strongly alkaline processing solutions for long periods of time, (2) are compatible with the other reagents present and (3) form clear films with the film-forming viscosity-increasing reagents which may be present.

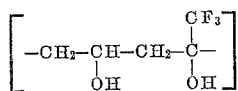
Polymeric materials which are particularly useful in the present invention are the weakly ionized polymeric acids, e.g., acids having ionization constants between about 10^{-6} and 10^{-12} and, more preferably, between 10^{-7} and 10^{-12} . Preferred groups of compounds within this class are the polyphenols, i.e., polymers comprising a plurality of hydroxyphenyl groups therein. As is known,

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such aromatic hydroxy groups are slightly ionized and are weak acids. Examples of materials of this type are phenol-formaldehyde condensation polymers such as the resols or novolaks. Other examples of such polyphenolic polymers are the hydroxybenzaldehyde acetals of a hydroxy substituted linear polymer e.g., polyvinyl alcohol, i.e.,



Especially useful acetals of this type are those formed with the hydrolysis product of a copolymer of vinyl acetate and α -trifluoromethyl vinyl acetate. Such hydrolysis products may be represented as possessing segments of the following structure:

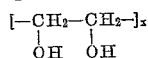


The preferred hydroxybenzaldehydes for forming the above acetals are those in which the hydroxy group is meta to the aldehyde group. Such meta compounds provide acetals which have especially good stability in the strongly alkaline processing solutions.

Another class of weakly ionized polymeric acids for use in the present invention are the primary and secondary polysulfonamides, i.e., polymers comprising a plurality of $\text{---SO}_2\text{NH}_2$ and/or $\text{---SO}_2\text{NHR}$ radicals wherein R may be an alkyl or phenyl group. Materials of this type which have been found particularly useful are polymers comprising phenyl sulfonamide groups. As examples of such materials, mention may be made of the acetals of primary and secondary formylbenzene sulfonamides with hydroxy substituted linear polymers such as polyvinyl alcohol or the above-mentioned hydrolysis product of a copolymer of vinyl acetate and α -trifluoromethyl vinyl acetate. Another example of such polymers are condensation polymers of benzenesulfonamide and formaldehyde such as Santolite MHP (trademark of Monsanto Chemical Co.). Further examples of other useful polysulfonamides are the linear polysulfonamides such as those formed from benzene disulfonyl chloride and a diamine such as hexamethylene diamine.

Other examples of weakly ionized polymeric acids which have been found useful in the present invention are polymers comprising α -trifluoromethylvinyl alcohol segments (hydroxyl group is weakly ionized), and benzene sulfonamides of deacetylated chitin, such as formed by condensing benzene sulfonyl chloride with deacetylated chitin.

Still another group of materials which are useful in the present invention are polymeric substances which are soluble in strong alkaline solutions, e.g., pH greater than 11 but become hydrogen bonded and are insoluble in solutions having pH's between about 7 to 9 and, more preferably, 9 to 11. As an example of such material, mention may be made of polyhydroxymethylene, i.e.,



which may be prepared by hydrolyzing polyvinylene carbonate. Another example of such a material is poly-2,2-bis-hydroxymethylethylene.

As mentioned above, the present invention is especially useful with image-receiving elements wherein means are provided therein for reducing the alkalinity of the processing solution. In simple embodiments, such means may comprise incorporating an acid such, for example, as oxalic, phthalic, benzoic, etc., in the image-receiving layer

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itself or in adjacent layers in which it may be available to neutralize alkali in the processing solution. Especially preferred methods of neutralizing the processing solution are disclosed in the above-mentioned application Ser. No. 234,864. In one of the preferred embodiments disclosed therein, an acid-reacting layer is disposed in the image-receiving element. The acid-reacting layer generally comprises a polymeric acid having non-diffusing acid groups thereon, e.g., cellulose acetate hydrogen phthalate, or a partial ester of an ethylene/maleic acid copolymer. During use, the alkali, subsequent to transfer of the image-forming substances, migrates into such layers and is neutralized, thereby reducing the pH of the layer of processing solution. In especially useful embodiments, the acid layer is separated from the image-receiving layer by a neutral layer or admixed with other neutral polymers to prevent premature reduction of the alkali concentration before development.

Other methods of reducing the pH of the altered layer of processing solution, e.g., by absorption of carbon dioxide from the air, also may be used; although said method of pH reduction is slower and less efficient than the use of a non-diffusing acid as disclosed in said Ser. No. 234,864.

As pointed out above, the present invention is primarily intended for use in processes wherein the layer of processing solution is adapted, when spread between the photosensitive element and the image-receiving element, to preferentially adhere to the image-receiving element when the elements are separated. Generally, such preferential adhesion is achieved by providing that the layer of the image-receiving element, which is contiguous to the layer of processing solution, has a greater affinity for the layer of processing solution than the contiguous layer of the photosensitive element. As can be appreciated, such preferential adhesion will vary depending upon the film forming material incorporated in the processing solution. Generally, it can be readily determined and achieved by simple procedures and technique known to the art.

In silver halide diffusion transfer processes it is generally preferred to provide precipitating nuclei, e.g., metallic sulfides such, for example, as lead sulfide, cadmium sulfide, zinc sulfide and nickel sulfide, and metallic selenides such as lead selenide and zinc selenide, in the image-receiving layer to facilitate the formation of the silver image thereon. In the embodiments of the present invention wherein at least a portion of the image is formed in the film of processing solution, such precipitating nuclei may be dispersed directly in the processing solution, as disclosed in U.S. Patent No. 2,662,822. Similarly, a dye mordant may be included in the processing solution in color transfer processes.

The following non-limiting examples illustrate the preparation of polymers for use in the present invention:

Example 1

122 gms. (1.0 mole) m-hydroxybenzaldehyde was dissolved in 1200 ml. of acetic acid in a three-necked, round bottomed flask equipped with a stirrer and condenser. 132 gms. (3.0 moles) of Elvanol 70-50 (substantially completely hydrolyzed polyvinyl alcohol), and 1 ml. of 85% phosphoric acid were added and the mixture was heated over a steam bath for about four hours until a clear dark-brown solution resulted. 1.5 gms. sodium acetate were added and the contents of the flask was decanted into water. The acetal of polyvinyl alcohol and m-hydroxybenzaldehyde which precipitated out was washed twice with water and dried under vacuum.

Example 2

14.0 gms. of polyvinyl alcohol was dissolved with heat and stirring in 400 ml. glacial acetic acid. 19.6 gms. of p-formyl benzenesulfonamide and 2 ml. of 85% phosphoric acid was added to the hot solution and the mixture was heated, with stirring, on a steam bath over-

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night. The resulting acetal of polyvinyl alcohol and p-formyl benzenesulfonamide was washed in acetone and dried under vacuum.

Example 3

Vinylene carbonate comprising 0.4% by weight, of azo-bis-isobutyronitrile was polymerized in bulk, under vacuum, at 70° C. for 72 hours. The resulting polymer was dissolved in dimethylformamide and precipitated into methanol and dried under vacuum. 10 gms. of the polymer was dissolved in 100 cc. of 5% aqueous sodium hydroxide solution with stirring and heating at 40° C. Heating was continued for about 20 minutes until the polymer precipitated out. The mixture was cooled and neutralized with acetic acid to complete the precipitation. The resulting polyhydroxymethylene was washed with water and dried.

Example 4

Part A.—A copolymer of vinyl acetate and α -trifluoromethylvinylacetate was prepared by polymerizing in bulk, under ultraviolet light, 15.4 gms. (0.1 mole) 2-acetoxy-3,3,3-trifluoropropene and 8.6 gms. (0.1 mole) of vinyl acetate. The resulting polymer was purified by precipitation from acetone into hexane and dried. 17 gms. of the resulting polymer was hydrolyzed at reflux in methyl alcohol having therein a catalytic amount of sodium methoxide. The resulting hydrolyzed polymer was precipitated through the addition of acetic acid and then washed and dried.

Part B.—The dried polymer was dissolved in 50 cc. of acetic acid. 12.2 gms. (0.1 mole) of 3-hydroxybenzaldehyde and 1 cc. of 85% phosphoric acid was added and the mixture was stirred for four hours at 60° C. The resulting partial acetal of 3-hydroxybenzaldehyde and the vinyl alcohol- α -trifluoromethylvinyl alcohol copolymer was precipitated into water, washed until neutral and dried.

Example 5

100 gms. of polyacrolein was dispersed with stirring in 2650 ml. of pyridine and 2250 ml. of 40% formaldehyde. The mixture was heated to 70° C. and 500 ml. of 2 N sodium hydroxide was slowly added and the solid dissolved. Heating is continued overnight at 70° C. and the solution is filtered and precipitated into acetone. The precipitated poly-2,2-bis-hydroxymethyl-ethylene was triturated twice with ethanol, once with a 3 to 1 acetone-water mixture and then hardened with acetone.

Example 6

92.4 gms. (1.14 m.) 37% formaldehyde was condensed with 130 gms. (1.38 m.) freshly distilled phenol in the presence of 2 gm. oxalic acid dihydrate. The resulting novolaktic phenol-formaldehyde polymer was precipitated from an acetone-methanol solution into water and dried under vacuum.

Example 7

10 gms. deacetylated chitin was dissolved in 1000 cc. of water and 15 cc. of concentrated hydrochloric acid. The solution was made just alkaline with 9% sodium hydroxide and then 50 cc. in excess of the 90% sodium hydroxide solution was added. 10 cc. of benzenesulfonyl chloride was added dropwise with rapid stirring and the resulting mixture was neutralized with sodium hydroxide. The resulting benzene-sulfonated chitin was filtered off, washed with water and stirred for three hours in 10% aqueous hydrochloric acid. After being filtered and washed, the polymer was precipitated from dilute sodium hydroxide with hydrochloric acid and washed and dried.

In the examples set forth below, the present invention is illustrated in conjunction with a multilayer color negative such as disclosed in U.S. Patent No. 2,983,606. In general, such negatives comprise a support bearing in turn a gelatin layer having dispersed therein, in a water-im-

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miscible solvent, a cyan dye developer such as 1,4-bis-[α -methyl - β - hydroquinonyl - ethylamino] - 5,8, - dihydroxy-anthraquinone; a red-sensitive silver iodobromide emulsion layer; a gelatin interlayer; a gelatin layer having dispersed therein, in a water-immiscible solvent, a magenta dye developer such as 2-[p-(2',5'-dihydroxyphenethyl)-phenylazo]-4-isopropoxy-1-naphthol; a green-sensitive silver iodobromide emulsion layer; a gelatin interlayer; a gelatin layer having dispersed therein, in a water-immiscible solvent, a yellow dye developer such as 1-phenyl - 3 - N - n - hexylcarbonyl - 4 - [p - (2',5' - dihydroxyphenethyl) - phenylazo] - 5 - pyrazolone; a blue-sensitive silver iodobromide emulsion layer and an outer thin stripping layer of cellulose acetate hydrogen phthalate so that the processing solution will preferentially adhere to the image-receiving element.

The following nonlimiting examples illustrate the present invention:

Example 8 (control)

An image-receiving element similar to those disclosed in copending application Ser. No. 234,864 was prepared by successively coating a cellulose nitrate subcoated baryta sheet with a layer of a partial butyl ester of an ethylene-maleic anhydride copolymer, a layer of polyvinyl alcohol, a layer of a mixture of polyvinyl alcohol and poly-4-vinylpyridine (2 to 1, by weight), and an outer layer of unhardened gelatin which serves as a preferential adhesion layer for the partially solidified processing solution. A multilayer, multicolor negative, as described above, was exposed and a thin layer of processing composition comprising:

Water	-----cc--	100
Potassium hydroxide	-----gm--	11.2
Hydroxyethyl cellulose	-----gm--	3.9
Benzotriazole	-----gm--	3.0
N-benzyl- α -picolinium bromide	-----gm--	2.0
Potassium thiosulfate	-----gm--	0.4
Lithium nitrate	-----gm--	0.2

was spread between said image-receiving element and said exposed multicolor negative as they were brought into superposed relationship. After an imbibition period of 1½ minutes the image-receiving element was separated from the negative. Upon separation, the layer of processing solution having a multicolor image therein, preferentially adhered to the image-receiving element and intensified the color image thereon. The layer of processing solution set so that it could not be moved around by the finger using normal handling pressure after about 3 minutes.

Example 9

The procedure of Example 8 was repeated except that the processing solution contained only 3.0 gms. of the hydroxyethyl cellulose and additionally 1.5 gms. of an acetal of polyvinyl alcohol and m-hydroxybenzaldehyde, as prepared in Example 1. Upon separating the image-receiving element from the negative, the layer of processing solution set so that it could not be moved around by the finger using normal handling pressure after about 1½ minutes.

Example 10

The procedure of Example 9 was repeated except that 1.5 gms. of an acetyl of polyvinyl alcohol and p-formylbenzenesulfonamide, as prepared in Example 2, was used in place of the acetal of polyvinyl alcohol and m-hydroxybenzaldehyde. Upon separation, the layer of processing solution set so that it could not be moved around by the finger using normal handling pressure after about 1½ minutes.

Example 11

The procedure of Example 9 was repeated except that 1.0 gm. of polyhydroxymethylene, as prepared in Example 3, was used in place of the acetal of polyvinyl al-

cohol and m-hydroxybenzaldehyde. Upon separation the layer of processing solution set so that it could not be moved around with the finger using normal handling pressure after about 2 minutes.

Example 12

The procedure of Example 9 was repeated except that 1.0 gm. of an acetal of 3-hydroxybenzaldehyde and a vinyl alcohol-1- α -trifluoromethylvinyl alcohol copolymer, as prepared in Example 4 (part B) was used in place of the acetal of polyvinyl alcohol and m-hydroxybenzaldehyde. Upon separation, the layer of the processing solution set so that it could not be moved around with the finger using normal handling pressure after about 35 seconds.

Example 13

The procedure of Example 9 was repeated except that 1.0 gm. of an α -trifluoromethylvinyl alcohol-vinyl alcohol copolymer, as prepared in Example 4 (part A), was used in place of the acetal of polyvinyl alcohol and m-hydroxybenzaldehyde. Upon separation the layer of processing solution set so that it could not be moved around with the finger using normal handling pressure after about 2 minutes.

Example 14

The procedure of Example 9 was repeated except that 1.5 gms. of a novolactic phenol-formaldehyde resin, as prepared in Example 6, was used in place of the acetal of polyvinyl alcohol and m-hydroxybenzaldehyde. Upon separation, the layer of processing solution set so that it could not be moved with the finger using normal handling pressure after about 1 minute and 35 seconds.

Example 15

The procedure of Example 9 was repeated except that 1.5 gms. of an acetyl of polyvinyl alcohol and p-hydroxybenzaldehyde was used in place of the acetal of polyvinyl alcohol and m-hydroxybenzaldehyde. Upon separation, the layer of processing solution set so that it could not be moved with the finger using normal handling pressure after about 2 minutes.

Example 16

The procedure of Example 9 was repeated using 1.5 gms. of Santolite MHP (trade name of Monsanto Chemical Co. for a formaldehydebenzenesulfonamide condensation polymer) in place of the acetal polyvinyl alcohol and m-hydroxybenzaldehyde. Upon separation, the layer of processing solution set so that it could not be moved with the finger using normal handling pressure after about 1 minute and 30 seconds.

Example 17

The procedure of Example 9 was repeated except that 1.5 gms. of benzenesulfonated chitin, as prepared in Example 7, was used in place of the acetal of polyvinyl alcohol and m-hydroxybenzaldehyde. The layer of processing solution set so that it could not be moved with the finger using normal handling pressure after about 1 minute and 30 seconds.

Example 18

The procedure of Example 9 was repeated except that 1.5 gms. of poly- α,α -bis(hydroxymethyl)-ethylene, as prepared in Example 5, was used in place of the acetal. The layer of processing solution set so that it could not be moved with the finger using normal handling pressure after about 1 minute and 20 seconds.

Example 19

The procedure of Example 9 was repeated except that in place of the acetal polyvinyl alcohol and m-hydroxybenzaldehyde there was used 1.5 gms. of a mixed acetal formed by reacting 1 mol. of polyvinyl alcohol with 0.33 mol. of trifluoroacetaldehyde and 0.33 mol. of m-hy-

droxybenzaldehyde in the presence of a catalytic amount of 85% phosphoric acid. The layer of processing solution set so that it could not be moved with the finger using normal handling pressure after about 1 minute and 15 seconds.

Example 20

The procedure of Example 9 was repeated except that in place of the acetal of polyvinyl alcohol and m-hydroxybenzaldehyde there was used 1.5 gms. of mixed acetal formed by condensing 2 mol. of polyvinyl alcohol with 0.33 mol. of 3-hydroxybenzaldehyde and 0.33 mol. of 4-pyridine-carboxaldehyde in the presence of a catalytic amount of 85% phosphoric acid. Upon separating the image-receiving element from the negative, the layer of processing solution set so that it could not be moved with a finger using normal handling pressure after about 1 minute and 30 seconds.

Example 21

The procedure of Example 9 was repeated except that only 2.0 gms. of the hydroxyethylcellulose was employed and in place of the hydroxybenzaldehyde acetal there was used 2.0 gms. of a linear sulfonamide prepared by condensing about equal molar amounts of hexamethylene diamine and 1,3-benzene disulfonyl chloride in the presence of sodium carbonate. The layer of processing solution set in about 1 minute on the image-receiving element.

Example 22

The procedure of Example 9 was repeated except that in place of the hydroxybenzaldehyde acetal there was employed 1.5 gms. of an acetal formed by condensing 5.35 gms. of a copolymer of vinyl alcohol and α -trifluoromethyl-vinyl alcohol, as prepared in Example 4, part A, with 6.36 gms. of p-formylbenzene sulfonamide. The layer of processing solution set in about 1½ minutes on the image-receiving element.

Although in the above examples the invention was illustrated with multicolor dye developer diffusion transfer processes, it should be clear that the invention can be equally useful in monochrome and black-and-white dye, as well as silver, diffusion transfer processes in general.

In the above examples the pH of the processing solution, which was greater than 13 initially, was reduced to at least about 9 to 11 at about the time the negative is separated, e.g., about 1 minute and 30 seconds. Usually it will continue to drop so that it will be, for example, between about 7 to 9 in about 1 minute after the negative is separated. In some instances the pH has dropped to values as low as 6 or even lower within several minutes after imbibition was terminated.

Although this invention has been described in terms of a separate image-receiving or image-carrying element to which the processing solution preferentially adheres, it may also be used in diffusion transfer processes employing only a single sheet, i.e., a viscous processing composition containing a film-forming polymer is applied to a photosensitive element, e.g., by a doctor blade or other coating techniques, and a transfer image is formed in the solidified layer of said processing composition which is allowed to remain adhered to the photosensitive element. The developed negative image may be masked by a layer of white pigment, e.g., titanium dioxide. Processes of this type are disclosed, e.g., in the aforementioned U.S. Patent No. 2,662,822.

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 shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. In a photographic process of forming a diffusion transfer image wherein an imagewise distribution of image-forming components is transferred from a photosensitive element at least to a layer of alkaline process-

ing solution to provide said transfer image, said processing solution including a film-forming material and being adapted to preferentially adhere to the element carrying said transfer image, the improvement of reducing the setting time of said adhered layer of processing solution comprising incorporating in said alkaline processing solution a polymeric substance which is soluble in said alkaline processing solution but precipitates when the pH is reduced to between about 7 to 11.

2. A process as defined in claim 1 wherein said polymeric material precipitates when the pH is reduced to between about 9 to 11.

3. A process as defined in claim 1 wherein said polymeric substance is a polymeric acid having an ionization constant between about 10^{-6} and 10^{-12} .

4. A process as defined in claim 3 wherein said polymeric acid has an ionization constant between about 10^{-7} and 10^{-12} .

5. A process as defined in claim 3 wherein said polymeric acid is a polyphenolic polymer.

6. A process as defined in claim 5 wherein said polyphenolic polymer is an acetal of a hydroxybenzaldehyde and a hydroxy-substituted linear polymer.

7. A process as defined in claim 6 wherein said linear polymer is polyvinyl alcohol.

8. A process as defined in claim 6 wherein said hydroxybenzaldehyde is a meta compound.

9. A process as defined in claim 3 wherein said polymeric acid is selected from the group consisting of primary and secondary polysulfonamides.

10. A process as defined in claim 9 wherein said polysulfonamide is an acetal of a primary formalbenzene sulfonamide and a hydroxy-substituted linear polymer.

11. A process as defined in claim 3 wherein said polymeric acid is a polymer comprising α -trifluoromethylvinyl alcohol segments.

12. A process as defined in claim 1 wherein said polymeric substance is benzenesulfonamide of deacetylated chitin.

13. A process as defined in claim 1 wherein said polymeric material becomes hydrogen bonded when the pH of said alkaline processing solution is reduced to between about 7 to 11.

14. In a photographic process of forming a diffusion transfer image in color wherein an exposed photosensitive element is developed in the presence of a dye developer to provide an imagewise distribution of unreacted dye developer which is transferred from said photosensitive element at least to a layer of alkaline processing solution which is disposed between said photosensitive element and a superposed image-receiving element, and wherein said image-receiving element comprises means for reducing the alkalinity of said processing solution and said processing solution has an initial pH of at least 12 and includes a film-forming material and is adapted to preferentially adhere to the image-receiving element when said image-re-

ceiving element is separated from the photosensitive element, the improvement of reducing the setting time of said layer of processing solution on said image-receiving element comprising incorporating in said alkaline processing solution a polymeric substance which is soluble in said alkaline processing solution but precipitates when the pH is reduced to between about 7 to 11.

15. A process as defined in claim 14 wherein said polymeric material precipitates when the pH is reduced to between about 9 to 11.

16. A process as defined in claim 14 wherein said polymeric substance is a polymeric acid having an ionization constant between about 10^{-6} and 10^{-12} .

17. A process as defined in claim 16 wherein said polymeric acid has an ionization constant between about 10^{-7} and 10^{-12} .

18. A process as defined in claim 16 wherein said polymeric acid is a polyphenolic polymer.

19. A process as defined in claim 18 wherein said polyphenolic polymer is an acetal of a hydroxybenzaldehyde and a hydroxy-substituted linear polymer.

20. A process as defined in claim 19 wherein said linear polymer is polyvinyl alcohol.

21. A process as defined in claim 19 wherein said hydroxybenzaldehyde is a meta compound.

22. A process as defined in claim 16 wherein said polymeric acid is selected from the group consisting of primary and secondary polysulfonamides.

23. A process as defined in claim 22 wherein said polysulfonamide is an acetal of a primary formylbenzene sulfonamide and a hydroxy-substituted linear polymer.

24. A process as defined in claim 16 wherein said polymeric acid is a polymer comprising α -trifluoromethylvinyl alcohol segments.

25. A process as defined in claim 14 wherein said polymeric substance is a benzenesulfonamide of deacetylated chitin.

26. A process as defined in claim 14 wherein said polymeric material becomes hydrogen bonded when the pH of said alkaline processing solution is reduced to between about 7 to 11.

27. A process as defined in claim 14 wherein at least a portion of the imagewise distribution of the unreacted dye developer is transferred through said processing solution to the image-receiving element to form an image thereon.

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55 NORMAN G. TORCHIN, *Primary Examiner*.

J. P. BRAMMER, *Assistant Examiner*.