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METHOD OF FORMING IMAGES OF DICHRIC MATERIALS

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Fig. 1

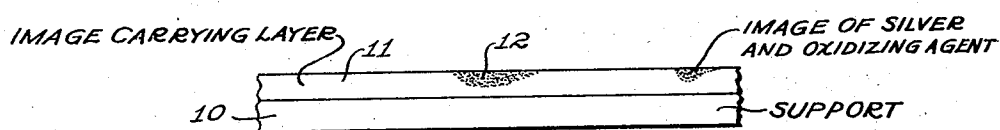
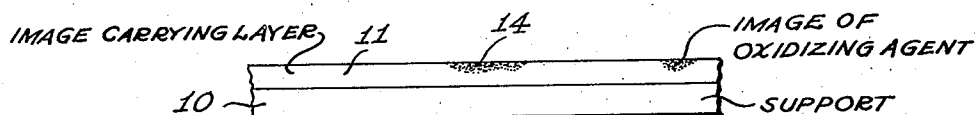


Fig. 2



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METHOD OF FORMING IMAGES OF
DICHROIC MATERIALS

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This invention relates to methods of forming images of dichroic materials, i. e., materials such as iodine, which plane polarize light when supported by, or suspended in, a suitable molecularly oriented plastic carrier, and to methods of producing said image in such carriers.

It is one object of the present invention to provide a novel method of producing images in polarized light, which images are known as "vectors" and, more specifically, to provide vectors which are reproductions of photographic images.

Another object of the invention is to provide a novel method of so transforming an image produced by exposing and developing a photosensitive emulsion as to produce a corresponding image in a dichroic material.

It is a further object of the invention to provide a novel method of chemically transforming a latent image, obtained by exposing a silver halide emulsion, to an image in iodine.

Further objects of the invention are the provision of a method of conventionally exposing a silver halide emulsion and thereafter subjecting said emulsion to a plurality of novel chemical transformations whereby iodine replaces the exposed silver halide particles of the original emulsion; the provision of a novel method of effecting the desired chemical transformation from a photosensitized silver halide to iodine whereby the iodine image is sharply and clearly defined; the provision of an oriented sheet of plastic, such as polyvinyl alcohol, adapted to render an iodine stain dichroic, surfaced with or containing a conventional silver halide emulsion, as for example of gelatin, or acting as the protective colloid for the silver halide, and the use thereof in carrying out the novel transformation of the invention to obtain a corresponding dichroic image; and the provision of a novel method of obtaining an iodine image in an unoriented material and of transforming said image to a molecularly oriented plastic carrier, as by a surface-to-surface contact, for the purpose of producing a corresponding dichroic image in said carrier.

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

The invention, accordingly, comprises the several steps and relation of one of said steps with respect to each of the others, which are exemplified in the following 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

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had to the following detailed description taken in connection with the accompanying drawing wherein

Fig. 1 is a schematic view of a photographic element used with the invention after exposure and development thereof to effect image formation therein; and

Fig. 2 is a schematic view of the element shown in Fig. 1 after further processing thereof.

This invention contemplates the production of a predetermined image, or the like, by the transformation of a portion of a layer of non-polarizing material to a polarizing area, whereby said image is obtained in polarized light. In accordance with the invention an emulsion of a photosensitive material, such as a silver halide, is exposed and then developed and converted in a novel manner to form the desired image in iodine.

In one method comprehended by the invention, the exposed silver halide is so developed as to form in situ with the silver image a secondary image, which secondary image is then subjected to a novel chemical transformation and converted thereby into the corresponding iodine image. At some stage in the transformation prior to the formation of the iodine image the silver and silver compounds are preferably removed.

In a preferred form of the invention, the silver halide emulsion consists of a sheet or layer of oriented plastic, which plastic is of such character that iodine is adapted to produce therein a light-polarizing stain. In another form of the invention the oriented plastic sheet, instead of forming part of the photosensitive emulsion from which the silver image is obtained, may constitute a base or a support for a conventional silver halide emulsion, as for example of gelatin, the iodine which forms the image migrating from the gelatin into the plastic sheet. In still another form of the invention, the silver halide emulsion may comprise a suspension of the silver halide in a mixture of gelatin and polyvinyl alcohol. It is also to be understood that other transformations of a latent image formed by exposure of a silver halide emulsion to an iodine image, are within the scope of the invention, as for example, a photosensitized conventional paper print may have the latent image converted to an iodine image, in accordance with the processes of the invention, and the iodine image may then be imprinted by a suitable transfer process on a sheet of oriented plastic to produce in said sheet a dichroic image.

In the preferred embodiments of the present invention, the molecularly oriented carrier in which the dichroic image is formed is a sheet of transparent, high molecular weight polymer adapted to form a dichroic sorption complex with iodine, said sheet preferably containing hydroxyl groups, and examples of suitable polymers are polyvinyl alcohol, partially hydrolyzed polyvinyl acetals and polyvinyl alcohol esters, and regenerated cellulose. Of the materials falling within this class the preferred material is polyvinyl alcohol and images formed in properly prepared sheets of that material possess the highest dichroism and hence are more suitable in the production of dichroic images.

In order to obtain the best results with respect to dichroism in the images of the present invention, at least one layer of molecules of the plastic carrier should first be oriented to substantial parallelism. This may be conveniently accomplished by softening the sheet, as for example by subjecting to heat and then stretching or extending the sheet until suitable orientation of the molecules has been obtained. In the case of polyvinyl alcohol, a sheet formed by casting may be placed in satisfactory condition for the formation of dichroic images therein by subjecting the sheet to mechanical stress, as for example, by stretching in a uniform direction until the molecules therein are sufficiently oriented. A stretch of from two to six times the original length of the sheet produces good result. Alternatively, the surface molecules of a sheet of polyvinyl alcohol may be oriented, as by application of linear frictional force thereto, without orienting the molecules throughout the remainder of the sheet.

Where the entire transformation of a latent silver halide image to an iodine image is effected in a molecularly oriented plastic carrier, the carrier is preferably one which maintains its orientation and is stable throughout the steps comprising the novel process of the invention. Polyvinyl alcohol, the preferred material for the plastic carrier, is stable in, and is permeable by, the solutions which convert and transform the latent silver halide image to the dichroic image of iodine. Polyvinyl alcohol is also relatively insoluble in said solutions so that a sharp dichroic image is obtained despite the several transformations which constitute the novel process of the invention.

The plastic carrier in any of the processes comprehended by the present invention may be supported on a sheet of a transparent plastic, as for example a cellulosic plastic, such as cellulose acetate and cellulose nitrate, or a vinyl compound, such as the vinyl acetals, vinyl acetate, vinyl chloride, the vinyl acetate-vinyl chloride copolymers, or a condensation type superpolymer, such as a polyamide or nylon type plastic. Cellulose acetate is a preferred material for the support and to form the most satisfactory material for the dichroic image there is bonded to at least one face of a sheet of said acetate, a sheet of molecularly oriented polyvinyl alcohol having a hydroxyl content, preferably in excess of 50%, said polyvinyl alcohol sheet being uniformly oriented throughout its entire thickness.

The following description of the invention is given by way of example in connection with a material having a silver halide suspension in an oriented plastic carrier on only one surface thereof whereby a single image in polarized light

is obtained. It is to be expressly understood, however, that the process is equally applicable to the formation of dichroic images on a material having both of its faces molecularly oriented and constituting part of, and supporting on both of its faces, silver halide suspensions adapted to provide desired images. The images may be of the same object and may bear a predetermined relation to one another. For example, one may be the left eye image and the other the right eye image of a stereoscopic pair, and the directions of the molecular orientations of the plastic layers carrying said images may be at substantially right angles to one another so that an observer of the iodine images, provided with a pair of suitably oriented analyzers, may have only the left eye image rendered visible to his left eye and only the right eye image to his right eye, whereby the object is seen stereoscopically.

In accordance with one method of carrying out the present invention, a silver halide emulsion is exposed and is thereafter developed to produce a silver image, the development being effected in a novel developing solution which gives, in addition to said silver image, an insoluble oxidation by-product which forms a secondary image in situ with said silver image. The oxidation by-product forming this secondary image is insoluble and stable, not only in the developer, but also in the bleach solution or solutions wherein, as a next step in the process, the silver is preferably transformed to a soluble compound and then removed by dissolution in a suitable solvent. This is preferably performed in a single solution but may be carried out in two solutions. The oxidation by-product forming the insoluble secondary image has a sufficiently high oxidation potential to release iodine from an iodide in the presence of a suitable releasing medium, such as an acid or other solvent for the secondary image, so that after the bleaching which removes the silver and the silver salts, the oxidation by-product is reacted with an iodide in the presence of said medium, releasing iodine. The released iodine replaces said product and forms the desired image. In instances wherein the iodine is formed in a gelatin layer coated on or supported by a molecularly oriented plastic in face-to-face contact therewith, the iodine on formation will migrate from the gelatin into the plastic to form the desired dichroic image in the latter.

The reduction product of the reaction of the insoluble secondary image and the iodide wherein the iodine image is formed, is preferably soluble in the iodide solution. If said product is insoluble in said solution it may be removed by washing the print in a further solution in which the iodine is relatively insoluble and in which the reduction product is relatively highly soluble. However, the removal of the reduction product is required only if the carrier for the silver halide is an oriented plastic, i. e., if the dichroic image is being formed directly in the carrier for the photosensitive emulsion. If the carrier is an unoriented material, such as a paper print, from which the iodine is to be transferred to an oriented plastic surface or sheet, the transfer of iodine to said oriented plastic can be effected without removing the reduction product of the iodine-forming reaction.

It will now be apparent that the selection of the materials for carrying out the instant invention, such as the developer solution and the bleach

solution, must be made in the light of the properties of both of said solutions and that the selection of any one will render available a great number of materials for the other. It is only necessary that a selected developer give an insoluble secondary image having the required oxidation potential and that the bleach bath, or baths, be selected in relation to the oxidizing product of said developer as to bleach the silver image and, if desired, remove the silver salts without affecting the secondary image comprising said product. These conditions may be satisfied by a large number of developer solutions and bleaching baths. Although the reducing agent for converting the silver halide to silver and producing the secondary image of an insoluble oxidizing agent may constitute the only reactive ingredient of the developing solution, an accelerator may be incorporated in the developing solution, as well as a restrainer, provided that said reducing agent is selected to give an oxidation by-product which is insoluble in whichever of said materials is added to the developer solution.

A suitable reducing agent for the novel developing step of the invention is p-dimethylaminophenol, which reduces the exposed silver halide and gives an oxidation by-product that is insoluble in the developer and has a high enough potential to release iodine from an iodide. Other suitable reducing agents are pyrocatechin, toluhydroquinone, 4-4'-dihydroxy diphenyl, monochlorohydroquinone, dichlorohydroquinone, 2-5 dihydroxydiphenyl, acetyl-p-aminophenol, p-benzylaminophenol, and 3-4 dihydroxy diphenyl. Each of these reducing agents is preferably used in a developing solution which is alkaline. To remove the silver and the silver salts without affecting the oxidation by-product, a preferred bleach for use in connection with all of the above specified developers consists of an aqueous solution of a mixture of potassium ferricyanide and ammonium thiocyanate. The potassium ferricyanide acts to transform the silver to a salt soluble in the ammonium thiocyanate. Other compounds known in the art for transforming the silver to soluble silver salts, such as sodium ferricyanide, may be used together with other known solvents for said salts, such as sodium and potassium thiocyanate, provided that none of the compounds so formed or solutions therefor, react with or dissolve the secondary image. The compound for transforming the silver to a soluble silver salt is preferably used in the same solution with the solvent for said salt, provided there is no undesirable interaction between said compound and said solvent.

The iodide solution wherein the iodine is released to form an iodine image preferably comprises potassium iodide and hydrochloric acid, although other iodides, such as sodium or ammonium iodide, and other acids, such as acetic or maleic, or other solvents for the secondary image, such as methanol, ethanol and acetone, may be used to equal advantage.

In the above-described method, the compound which gives the insoluble secondary image is formed as a direct oxidation by-product of the reaction whereby the silver halide is converted to silver. In an alternative form of the invention the novel developing step for obtaining the insoluble secondary image of the desired oxidizing potential is carried out by using in the developing solution a compound for developing the silver halide to give a silver image and a coupler which reacts with the by-product of the reduction of the

silver halide to form the desired secondary image. A suitable developing solution for this purpose comprises para-amino-diethylaniline as the reducing agent for the silver halide, and ortho cresol as the coupler. The print is then preferably bleached and the silver salts are removed and a suitable bleach for this purpose is an aqueous solution of a mixture of potassium ferricyanide and potassium thiocyanate. The secondary image is then reacted with an iodide in the presence of an acid to form the iodine image. In the practice of the above method, it is to be understood that the coupler may be contained in the silver halide emulsion.

It is also to be understood that the invention comprehends any process wherein a latent image, produced by the exposure of a silver halide, is transformed or converted to, or causes the formation of, an image comprising a compound which releases iodine from an iodide in a solution containing a solvent for said compound such, for example, as an acid.

The following examples of the novel process of the present invention are given for purposes of illustration, but it is to be expressly understood that the proportions, temperatures and times may be varied within wide ranges and that the ingredients may also be varied, as specified hereinabove and as will now be apparent to those skilled in the art.

Example 1

A layer or sheet of molecularly oriented polyvinyl alcohol containing, or supporting, a silver halide emulsion and mounted on a suitable supporting sheet of cellulose acetate, is exposed and is then immersed in a developing solution consisting of:

p-Dimethylaminophenol	-----	1/2
Sodium hydroxide	-----do-----	1
Water	-----c. c.-----	100

Immersion in the above solution for approximately one to two minutes gives good results and the developer is preferably maintained at approximately room temperature during this step of the process. The print is then washed and immersed for approximately one minute in a solution for bleaching the silver image and for removing the silver salts, which solution consists of:

Potassium ferricyanide	-----grams--	3
Ammonium thiocyanate	-----do-----	34
Water	-----c. c.-----	200

The print is then washed and placed in an acid solution of potassium iodide consisting of:

Potassium iodide, 10% solution	-----	100
Hydrochloric acid, 2N solution	-----	25
for approximately 30 seconds.		

It is preferable to immerse the print in a final fixing bath, which bath contains boric acid, to stabilize the dichroic image. The fixing bath may also contain sodium sulfate to prevent softening of the plastic sheets, potassium iodide to provide a control for the color of the image, and in some instances a weak solution of sodium thiosulfate.

Example 2

A layer or sheet of molecularly oriented polyvinyl alcohol containing, or supporting, a silver halide emulsion and mounted on a suitable supporting sheet of cellulose acetate, is exposed and

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is then immersed in a developing solution consisting of:

p-Aminodiethylaniline hydrochloride	grams	1
o-Cresol	do	0.5
Sodium hydroxide	do	0.5
Water	c. c.	100

After immersion in the above solution for approximately one to two minutes, the print is subjected to the several steps of the process described in Example 1 as following the developing of the latent image.

Example 3

The molecularly oriented polyvinyl alcohol layer or sheet of Example 1 is treated in the same way as disclosed in Example 1 except that the silver image is bleached and the silver salts are removed in a solution consisting of:

Potassium ferricyanide, 10% solution	c. c.	80
Sodium thiosulfate, 25% solution		20

Example 4

The method described in Example 1 is followed except that the developing solution consists of:

Pyrocatechin	grams	3
Potassium bromide	do	1/2
Sodium thiosulfate, 20% solution	c. c.	80
Water	c. c.	100
Sodium hydroxide, 15% solution	c. c.	12

Example 5

The method described in Example 1 is followed except that the developing solution consists of:

Toluhydroquinone	grams	1/2
Potassium bromide	do	2%
Sodium hydroxide	do	1
Water	c. c.	100

Example 6

The method described in Example 1 is followed except that the developing solution consists of:

3-4 dihydroxydiphenyl	grams	1
Sodium hydroxide	do	1
Water	c. c.	100

Example 7

If the silver halide emulsion of Example 1 is silver chloride, the method of said example may be carried out with the following developing solution:

4-4' dihydroxydiphenyl	grams	1
Sodium hydroxide, 3% solution	c. c.	100

It will be noted that in every example given above, it is contemplated that the iodine image will be formed in a sheet of a high polymer which is molecularly oriented. It is conceivable that the novel transformation of a latent silver halide image to an iodine image, in accordance with the present invention, may be useful in connection with other processes than the formation of dichroic images and, accordingly, it is expressly understood that unless the claims so specify, they are not limited to the formation of an iodine image in a carrier which is molecularly oriented.

By way of understanding the heretofore described practices, Figs. 1 and 2 schematically show a photographic element during various stages of processing. The element shown in Figs. 1 and 2 comprises a suitable support 10 for an image-carrying layer 11. Fig. 1 portrays a photographic element which has an image-carrying layer initially sensitized with silver halide and in

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a condition following the exposure and development of the layer in accordance with the teachings of the invention to provide an image 12 therein comprising silver and an oxidizing agent. Fig. 2 discloses the element after further treatment, as by the bleaching procedure heretofore set forth, to remove the silver and to leave an image formed only of an oxidizing agent, the same being indicated by the reference character 14.

From the foregoing description it will be apparent to those skilled in the art that if the layer 11 is a molecularly oriented carrier, treatment thereof with a suitable iodide solution will replace the image 14 formed of the oxidizing agent with iodine. In the event that the layer 11 is gelatin and the support 10 is molecularly oriented plastic, iodine released from a solution of an iodide by the oxidizing agent will form a light-polarizing image in iodine in the plastic support. Also, if the layer 11 represents a conventional paper print in which an image 14 comprising an oxidizing agent has been formed, it may be used in the described transfer process to provide a light-polarizing image in molecularly oriented plastic material when brought into contact therewith and treated in the manner already set forth.

As has been previously stated, the foregoing description is illustrative only of operative embodiments of the present invention. It must be emphasized that each step therein is a variable and that none of the ingredients, times, or proportions for any step or solution are critical except insofar as they may be made so by the other variables. The specific examples given comprise operative embodiments of the invention with which excellent results have been obtained. However, considerable variation is possible in virtually any degree thereof, and one or more solutions or steps can be compensated for in the other steps. It is, accordingly, obvious that no set rules can be given and it would be difficult, if not impossible, even to set outside limits on the ranges of variation.

It is to be understood that the term "relatively water-insoluble" as utilized in the claims in reference to the carrier for the silver image refers to an insolubility such as will prevent water solutions from appreciably dissolving said carrier in the time in which the reactions transforming the silver halide image to the iodine image take place.

Since certain changes may be made in carrying out the above process without departing from the scope of the invention, it is intended that all matter contained in the above description shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

What is claimed is:

1. The method of producing a dichroic image, which comprises photo-exposing a silver halide suspension to produce a latent image, developing said latent image to form an image comprising a water-insoluble oxidizing agent having an oxidation potential sufficiently high to release iodine from an iodide, reacting the image comprising said oxidizing agent with an iodide in the presence of a solvent for said oxidizing agent which dissolves the latter and causes it to release

iodine from the iodide, and having present at some stage during the release of said iodine, in a position to receive said iodine, a layer of molecularly oriented high polymer which forms a dichroic sorption complex with iodine.

2. The method of producing a dichroic image, which comprises photo-exposing a silver halide suspension to produce a latent image, developing said latent image to form an image comprising silver and a water-insoluble oxidizing agent having an oxidation potential sufficiently high to release iodine from an iodide, reacting said image with a bleaching agent for silver which is inert to said oxidizing agent, reacting the image comprising said oxidizing agent with an iodide in the presence of a solvent for said oxidizing agent which dissolves the latter and causes it to release iodine from the iodide, and having present at some stage during the release of said iodine, in a position to receive said iodine, a layer of molecularly oriented high polymer which forms a dichroic sorption complex with iodine.

3. The method of producing a dichroic image, which comprises photo-exposing a silver halide suspension to produce a latent image, developing said latent image to form an image comprising silver and a water-insoluble oxidizing agent having an oxidation potential sufficiently high to release iodine from an iodide, reacting said image with a bleaching agent for silver which is inert to said oxidizing agent, removing the silver compounds from said carrier in a solution in which said oxidizing agent is relatively insoluble, reacting the image comprising said oxidizing agent with an iodide in the presence of a solvent for said oxidizing agent which dissolves the latter and causes it to release iodine from the iodide, and having present at some stage during the release of said iodine, in a position to receive said iodine, a layer of molecularly oriented high polymer which forms a dichroic sorption complex with iodine.

4. The method of producing a dichroic image, which comprises photo-exposing a silver halide suspension to produce a latent image, transforming said latent image by reaction with a developer and a coupler to an image comprising silver and a water-insoluble oxidizing agent having an oxidation potential sufficiently high to release iodine from an iodide, reacting said image with a bleaching agent for silver which is inert to said oxidizing agent, removing the silver compounds from said carrier in a solution in which said oxidizing agent is relatively insoluble, reacting the image comprising said oxidizing agent with an iodide in the presence of a solvent for said oxidizing agent which dissolves the latter and causes it to release iodine from the iodide, and having present at some stage during the release of said iodine, in a position to receive said iodine, a layer of molecularly oriented high polymer which forms a dichroic sorption complex with iodine.

5. The method of producing a dichroic image, which comprises photo-exposing a silver halide suspension to produce a latent image, developing said latent image to form an image comprising a water-insoluble oxidizing agent having an oxidation potential sufficiently high to release iodine from an iodide, reacting the image comprising said oxidizing agent with an iodide in the presence of an acid whereby iodine is released, and having present at some stage during the release of said iodine, in a position to receive said iodine, a layer of molecularly oriented high polymer

which forms a dichroic sorption complex with iodine.

6. The method of producing a dichroic image, which comprises photo-exposing a silver halide suspension to produce a latent image, developing said latent image to form an image comprising silver and a water-insoluble oxidizing agent having an oxidation potential sufficiently high to release iodine from an iodide, reacting said image with a bleaching agent for silver which is inert to said oxidizing agent, reacting the image comprising said oxidizing agent with an iodide in the presence of an acid whereby iodine is released, and having present at some stage during the release of said iodine, in a position to receive said iodine, a layer of molecularly oriented high polymer which forms a dichroic sorption complex with iodine.

7. The method of producing a dichroic image, which comprises photo-exposing a silver halide suspension to produce a latent image, developing said latent image to form an image comprising silver and a water-insoluble oxidizing agent having an oxidation potential sufficiently high to release iodine from an iodide, reacting said image with a bleaching agent for silver which is inert to said oxidizing agent, removing the silver compounds from said carrier in a solution in which said oxidizing agent is relatively insoluble, reacting the image comprising said oxidizing agent with an iodide in the presence of an acid whereby iodine is released, and having present at some stage during the release of said iodine, in a position to receive said iodine, a layer of molecularly oriented high polymer which forms a dichroic sorption complex with iodine.

8. The method of producing a dichroic image, which comprises photo-exposing a silver halide suspension to produce a latent image, transforming said latent image by reaction with a developer and a coupler to an image comprising silver and a water-insoluble oxidizing agent having an oxidation potential sufficiently high to release iodine from an iodide, reacting said image with a bleaching agent for silver which is inert to said oxidizing agent, removing the silver compounds from said carrier in a solution in which said oxidizing agent is relatively insoluble, reacting the image comprising said oxidizing agent with an iodide in the presence of an acid whereby iodine is released, and having present at some stage during the release of said iodine, in a position to receive said iodine, a layer of molecularly oriented high polymer which forms a dichroic sorption complex with iodine.

9. The method of producing a dichroic image, which comprises providing a photosensitive silver halide suspension in a relatively water-insoluble carrier comprising at least a layer of a permeable molecularly oriented high polymer having an affinity for iodine and adapted to form a dichroic sorption complex therewith, said layer supporting said silver halide suspension, photo-exposing the silver halide to produce a latent image, developing said latent image to form an image comprising silver and a water-insoluble oxidizing agent having an oxidation potential sufficiently high to release iodine from an iodide, reacting said image with a bleaching agent for silver which is inert to said oxidizing agent, removing the silver compounds from said carrier in a solution in which said oxidizing agent is relatively insoluble, and reacting the image comprising said oxidizing agent with an iodide in the presence of

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an acid whereby iodine is released to form the image in iodine.

10. The method of producing a dichroic image, which comprises providing a photosensitive silver halide suspension in a relatively water-insoluble carrier comprising at least a layer of a permeable molecularly oriented high polymer having an affinity for iodine and adapted to form a dichroic sorption complex therewith, said layer supporting said silver halide suspension, photo-exposing the silver halide to produce a latent image, transforming said latent image by reaction with a developer and a coupler to an image comprising silver and a water-insoluble oxidizing agent having an oxidation potential sufficiently high to release iodine from an iodide, reacting said image with a bleaching agent for silver which is inert to said oxidizing agent, removing the silver compounds from said carrier in a solution in which said oxidizing agent is relatively insoluble, and reacting the image comprising said oxidizing agent with an iodide in the presence of an acid whereby iodine is released to form the image in iodine.

11. The method of producing a dichroic image, which comprises providing a photosensitive silver halide suspension in a carrier having at least the layer which supports said suspension formed of a molecularly oriented polyvinyl alcohol, photo-exposing the silver halide to produce a latent image, developing said latent image to form an image comprising silver and a water-insoluble oxidizing agent having an oxidation potential sufficiently high to release iodine from an iodide, reacting said image with a bleaching agent for silver which is inert to said oxidizing agent, removing the silver compounds from said carrier in a solution in which said oxidizing agent is relatively insoluble, and reacting the image comprising said oxidizing agent with an iodide in the presence of an acid whereby iodine is released to form the image in iodine.

12. The method of producing a dichroic image, which comprises providing a photosensitive silver halide suspension in a carrier having at least the layer which supports said suspension formed of a molecularly oriented polyvinyl alcohol, photo-exposing the silver halide to produce a latent image, transforming said latent image by reaction with a developer and a coupler to an image comprising silver and a water-insoluble oxidizing agent having an oxidation potential sufficiently high to release iodine from an iodide, reacting said image with a bleaching agent for silver which is inert to said oxidizing agent, removing the silver compounds from said carrier in a solution in which said oxidizing agent is relatively insoluble, and reacting the image comprising said oxidizing agent with an iodide in the presence of an acid whereby iodine is released to form the image in iodine.

13. The method of producing a dichroic image, which comprises providing a photosensitive silver halide suspension in a permeable relatively water-insoluble carrier, photo-exposing the silver halide to produce a latent image, developing said latent image to form an image comprising a water-insoluble oxidizing agent having an oxidation potential sufficiently high to release iodine from an iodide, reacting the image comprising said oxidizing agent with an iodide in the presence of an acid whereby iodine is released to form the image in iodine, and bringing into face-to-face contact with said carrier a transparent molecularly oriented high polymer adapted to form a dichroic

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sorption complex with iodine and having a greater affinity for iodine than said carrier.

14. The method of producing a dichroic image, which comprises providing a photosensitive silver halide suspension in a permeable relatively water-insoluble carrier, photo-exposing the silver halide to produce a latent image, developing said latent image to form an image comprising silver and a water-insoluble oxidizing agent having an oxidation potential sufficiently high to release iodine from an iodide, reacting said image with a bleaching agent for silver which is inert to said oxidizing agent, reacting the image comprising said oxidizing agent with an iodide in the presence of an acid whereby iodine is released to form the image in iodine, and bringing into face-to-face contact with said carrier a transparent molecularly oriented high polymer adapted to form a dichroic sorption complex with iodine and having a greater affinity for iodine than said carrier.

15. The method of producing a dichroic image, which comprises providing a photosensitive silver halide suspension in a permeable relatively water-insoluble carrier, photo-exposing the silver halide to produce a latent image, developing said latent image to form an image comprising a water-insoluble oxidizing agent having an oxidation potential sufficiently high to release iodine from an iodide, reacting the image comprising said oxidizing agent with an iodide in the presence of an acid whereby iodine is released to form the image in iodine, and bringing into face-to-face contact with said carrier a molecularly oriented polyvinyl alcohol.

16. The method of producing a dichroic image, which comprises providing a photosensitive silver halide suspension in a permeable relatively water-insoluble carrier, photo-exposing the silver halide to produce a latent image, developing said latent image to form an image comprising silver and a water-insoluble oxidizing agent having an oxidation potential sufficiently high to release iodine from an iodide, reacting said image with a bleaching agent for silver which is inert to said oxidizing agent, reacting the image comprising said oxidizing agent with an iodide in the presence of an acid whereby iodine is released to form the image in iodine, and bringing into face-to-face contact with said carrier a molecularly oriented polyvinyl alcohol.

17. The method of producing a dichroic image, which comprises providing a photosensitive silver halide suspension in a permeable relatively water-insoluble carrier, photo-exposing the silver halide to produce a latent image, developing said latent image to form an image comprising a water-insoluble oxidizing agent having an oxidation potential sufficiently high to release iodine from an iodide, immersing said carrier in an iodide, and bringing said carrier into face-to-face contact with a transparent molecularly oriented high polymer containing an acid and adapted to form a dichroic sorption complex with iodine.

18. The method of producing a dichroic image, which comprises providing a photosensitive silver halide suspension in a permeable relatively water-insoluble carrier, photo-exposing the silver halide to produce a latent image, developing said latent image to form an image comprising silver and a water-insoluble oxidizing agent having an oxidation potential sufficiently high to release iodine from an iodide, reacting said image with a bleaching agent for silver which is inert to said oxidizing agent, immersing said carrier in an iodide, and bringing said carrier into face-to-face contact with a

transparent molecularly oriented high polymer containing an acid and adapted to form a dichroic sorption complex with iodine.

19. The method of producing a dichroic image, which comprises providing a photosensitive silver halide suspension in a permeable relatively water-insoluble carrier, photo-exposing the silver halide to produce a latent image, developing said latent image to form an image comprising a water-insoluble oxidizing agent having an oxidation potential sufficiently high to release iodine from an iodide, immersing said carrier in an iodide, and bringing said carrier into face-to-face contact with a molecularly oriented polyvinyl alcohol containing an acid.

20. The method of producing a dichroic image, which comprises providing a photosensitive silver halide suspension in a permeable relatively water-insoluble carrier, photo-exposing the silver halide to produce a latent image, developing said latent image to form an image comprising silver and a water-insoluble oxidizing agent having an oxidation potential sufficiently high to release iodine from an iodide, reacting said image with a bleaching agent for silver which is inert to said oxidizing agent, immersing said carrier in an iodide, and bringing said carrier into face-to-face contact with a molecularly oriented polyvinyl alcohol containing an acid.

21. The method of producing an iodine image, which comprises providing a photosensitive silver halide suspension in a permeable relatively water-insoluble carrier, photo-exposing the silver halide to produce a latent image, developing said latent image in an alkaline solution comprising monochlorohydroquinone to form an image comprising silver and an oxidizing agent insoluble in said solution and having an oxidation potential sufficiently high to release iodine from an iodide, reacting said image with a bleaching agent for silver which is inert to said oxidizing agent, removing the silver compounds from said carrier in a solution in which said oxidizing agent is relatively insoluble, and reacting the image comprising said oxidizing agent with an iodide in the presence of an acid whereby iodine is released to form the image in iodine.

22. The method of producing an iodine image, which comprises providing a photosensitive silver halide suspension in a permeable relatively water-insoluble carrier, photo-exposing the silver halide to produce a latent image, developing said latent image in an alkaline solution comprising p-dimethylaminophenol to form an image comprising silver and an oxidizing agent insoluble in said solution and having an oxidation potential sufficient high to release iodine from an iodide, reacting said image with a bleaching agent for silver which is inert to said oxidizing agent, removing the silver compounds from said carrier in a solution in which said oxidizing agent is relatively insoluble, and reacting the image comprising said oxidizing agent with an iodide in the presence of an acid whereby iodine is released to form the image in iodine.

23. The method of producing an iodine image, which comprises providing a photosensitive silver halide suspension in a permeable relatively water-insoluble carrier, photo-exposing the silver halide to produce a latent image, developing said latent image in an alkaline solution comprising p-dimethylaminophenol to form an image comprising silver and an oxidizing agent insoluble in said solution and having an oxidation potential sufficiently high to release iodine from an iodide,

reacting said image with a bleaching agent from the class consisting of sodium ferricyanide and potassium ferricyanide, removing the silver compounds from said carrier in a solution of a compound from the class consisting of ammonium thiocyanate, sodium thiocyanate and potassium thiocyanate, and reacting the image comprising said oxidizing agent with an iodide in the presence of an acid whereby iodine is released to form the image in iodine.

24. The method of producing an iodine image, which comprises providing a photosensitive silver halide suspension in a permeable relatively water-insoluble carrier, photo-exposing the silver halide to produce a latent image, developing said latent image in an alkaline solution comprising monochlorohydroquinone to form an image comprising silver and an oxidizing agent insoluble in said solution and having an oxidation potential sufficiently high to release iodine from an iodide, reacting said image with a bleaching agent from the class consisting of sodium ferricyanide and potassium ferricyanide, removing the silver compounds from said carrier in a solution of a compound from the class consisting of ammonium thiocyanate, sodium thiocyanate and potassium thiocyanate, and reacting the image comprising said oxidizing agent with an iodide in the presence of an acid whereby iodine is released to form the image in iodine.

25. The method of producing an iodine image, which comprises providing a photosensitive silver halide suspension in a permeable relatively water-insoluble carrier, photo-exposing the silver halide to produce a latent image, transforming said latent image by reaction with p-amino-diethylaniline and o-cresol to an image comprising silver and a water-insoluble oxidizing agent having an oxidation potential sufficiently high to release iodine from an iodide, reacting said image with a bleaching agent for silver which is inert to said oxidizing agent, removing the silver compounds from said carrier in a solution in which said oxidizing agent is relatively insoluble, and reacting the image comprising said oxidizing agent with an iodide in the presence of an acid whereby iodine is released to form the image in iodine.

26. The method of producing an iodine image, which comprises providing a photosensitive silver halide suspension in a permeable relatively water-insoluble carrier, photo-exposing the silver halide to produce a latent image, transforming said latent image by reaction with p-amino-diethylaniline and o-cresol to an image comprising silver and a water-insoluble oxidizing agent having an oxidation potential sufficiently high to release iodine from an iodide, reacting said image with a soluble of potassium ferricyanide and potassium thiocyanate to remove the silver and silver salts, and reacting the image comprising said oxidizing agent with an iodide in the presence of an acid whereby iodine is released to form the image in iodine.

27. The method of forming a dichroic image which comprises photoexposing a permeable relatively water-insoluble carrier which is sensitized with silver halide to form a latent image therein, developing said latent image to form an image comprising a water-insoluble oxidizing agent having an oxidation potential sufficient to effect the release of iodine from an iodide, reacting the image comprising said oxidizing agent with an iodide in the presence of an acid whereby iodine is released, and causing the iodine to migrate into a molecularly oriented polymeric plastic to form

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in the oriented plastic a dichroic sorption complex in iodine.

28. The method of forming a dichroic image which comprises photoexposing a permeable relatively water-insoluble carrier which is sensitized with silver halide to form a latent image therein, developing said latent image to form an image comprising silver and a water-insoluble oxidizing agent having an oxidation potential sufficient to effect the release of iodine from an iodide, reacting said image with a bleaching agent

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for silver which is inert to said oxidizing agent, reacting the image comprising said oxidizing agent with an iodide in the presence of an acid whereby iodine is released, and causing the iodine to migrate into a molecularly oriented polymeric plastic to form in the oriented plastic a dichroic sorption complex in iodine.

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