Dec. 31, 1946. H. P. HUSEK 2,413,630

PROCESS FOR PRODUCING IODINE IMAGES

Filed Aug. 3, 1944

FIG. 1

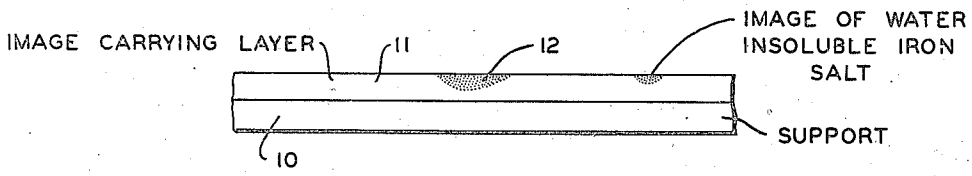
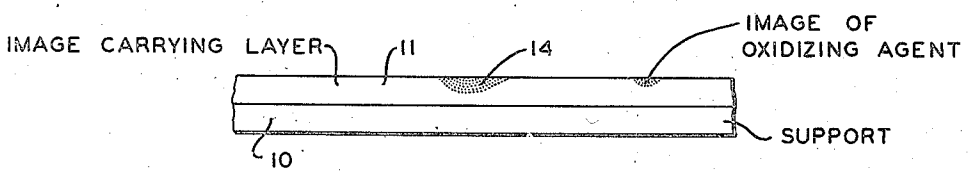



FIG. 2




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Patented Dec. 31, 1946 2,413,630

# UNITED STATES PATENT OFFICE

2,413,630

## PROCESS FOR PRODUCING IODINE IMAGES

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Application August 3, 1944, Serial No. 547,977

21 Claims. (Cl. 95—6)



This invention relates to methods of forming images of 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 images in such carriers.

It is one object of the present invention to provide a novel method of producing images whose contrast is a function of the direction of vibration of polarized light transmitted by the images, which images are known as "vectographs" and, more specifically, to provide a method for producing vectographs which are reproductions of photographic images.

A further object of the invention is to provide a novel method of the above character which is relatively simple and comprises relatively few steps.

Another object is to provide a novel method of chemically transforming an image formed by differentially exposing a photosensitive emulsion comprising a ferric salt to an image formed of a dichroic material, e. g., iodine.

A still further object of the invention is the provision of a method of exposing a photosensitive emulsion comprising a ferric salt and thereafter subjecting said emulsion to a plurality of chemical transformations whereby iodine is caused to replace the exposed ferric salt particles of the original emulsion.

Further objects are the provision of novel methods wherein the reactions forming the iodine are carried out in or on a molecularly oriented carrier; wherein the reactions forming the iodine are carried out in an unoriented carrier and the iodine image is transferred after formation to a molecularly oriented carrier; and wherein the iodine image is not formed in the nonoriented carrier until the molecularly oriented carrier is brought into face-to-face contact therewith.

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 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 treatment thereof to effect image formation therein; and



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

In accordance with the present invention, a photosensitive emulsion comprising a ferric salt as the photosensitive material is differentially exposed to light, the ferric salt being transformed wherever exposed to the corresponding ferrous salt in a manner well understood in the art. The latter is then converted in a novel manner to an image of dichroic material, e. g., iodine. In a preferred form of the invention, the ferric salt is dispersed throughout a sheet of molecularly oriented plastic, which plastic is of such character that iodine is adapted to produce therein a light-polarizing stain. Accordingly, by replacing the ferrous salt by iodine, a dichroic image, corresponding to the ferrous salt image, is obtained in the molecularly oriented plastic. The ferric salt may be incorporated in the plastic carrier by casting or otherwise forming the latter from a mixture or solution containing said salt. It is preferable, however, to form the carrier sheet first and then immerse the latter in a suitable solution of the ferric salt so that the carrier will imbibe the solution and when dried will contain the ferric salt therein. The plastic carrier may be molecularly oriented after the imbibition, but is preferably oriented prior to the imbibition so that after the sheet is imbibed and dried it is ready for use.

A dichroic image of iodine may also be obtained in a molecularly oriented plastic in accordance with the present invention by forming an "emulsion" of the ferric salt, for example, in any suitable film-forming colloid such as gelatin, glue or albumen, and providing a layer of said emulsion on the molecularly oriented plastic. The iodine image, which is formed in the colloid, permeates therethrough to the molecularly oriented carrier and forms the desired dichroic image therein. A ferric salt "emulsion" of this character may be cast directly onto the oriented plastic.

The molecularly oriented plastic carrier in which the dichroic image is formed is preferably a sheet of transparent, high molecular weight polymer adapted to form a dichroic sorption complex with iodine, said sheet preferably containing hydroxyl groups. Examples of suitable polymers for this purpose 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. The molecules of the plastic carrier may be oriented, for example, by softening the sheet, as, by subjecting it to heat and then stretching or extending the sheet until the desired 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 results. 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.

It is also within the scope of the invention to effect the transformation of an exposed ferric salt to an iodine image in an unoriented carrier as, for example, in a layer of gelatin or paper, and to transfer the image thus formed to a molecularly oriented carrier as by bringing the carriers into face-to-face engagement. In this modification of the invention the iodine image is preferably formed after the oriented and unoriented sheets are brought into face-to-face contact with one another, as by including one of the ingredients causing the formation of the iodine image in the molecularly oriented carrier.

Where a ferric salt supported or carried by a molecularly oriented carrier is transformed in said carrier to iodine, 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 exposed ferric salts to the dichroic image of iodine. Polyvinyl alcohol is also sufficiently insoluble in said solutions to give a sharp and well-defined dichroic image.

The plastic carrier in any of the processes comprehended by the present invention may be supported on a sheet of transparent plastic, as for example a cellulosic plastic, such as cellulose acetate and cellulose nitrate, or a polyvinyl compound, such as a polyvinyl acetal, a polyvinyl ester, polyvinyl chloride, a polyvinyl acetate-chloride copolymer or a condensation type superpolymer, such as a polyester, polycarbonamide, or polyacetal, of which the Nylon-type plastics are typical examples. 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.

In accordance with one method of carrying out the present invention, a layer of the molecularly oriented polyvinyl alcohol is provided with a suspension of a photosensitive ferric salt or a mixture of said salts. Any of the photosensitive ferric salts useful for blueprint purposes may be employed, as, for example, ferric ammonium citrate, ferric ammonium oxalate, ferric sodium oxalate, and ferric oxalate. In a preferred form



of the invention, a mixture of two or more of these salts is used whereby an emulsion more sensitive to light is obtained and a preferred mixture is one comprising all of the above-named ferric salts.

Although the organic ferric salts of the character specified are preferred, it is to be understood that inorganic ferric salts such as ferric chloride may be used.

As a first step in the novel process, the suspension of ferric salts is exposed, and wherever exposed, the ferric salts are converted by the action of the light to the corresponding ferrous salt. The ferrous salts are thereafter reacted with a suitable agent such as a water-soluble ferricyanide, for example potassium ferricyanide, ammonium ferricyanide, or sodium ferricyanide to produce an insoluble ferricyanide of iron, viz., Turnbull's Blue. This insoluble iron salt may exist in several forms, changing on molecular rearrangement to ferric ferrocyanide. During this conversion the unexposed ferric salts are removed as by being dissolved. The water-soluble ferricyanide may be included with the ferric salts in the photosensitive emulsion or suspension. Accordingly, after exposure the latter need only be immersed in water to effect the desired reaction between the exposed ferric salts and the ferricyanide, the water also serving as the solvent for removing the unexposed ferric salts. The water-insoluble iron salt which is the product of the last reaction is then transformed to an oxidizing agent having a sufficient oxidation potential to release iodine from an iodide. For example, said iron salt may be reacted with a suitable base such as sodium or potassium hydroxide to form ferric hydroxide. The metallic hydroxide is then reacted with an iodide in the presence of a solvent for said hydroxide, as, for example, an acid solution of the iodide, to release iodine which replaces the hydroxide and forms the desired iodine image. Examples of suitable iodides for this step are sodium iodide, potassium iodide and ammonium iodide, and these may be used in solution with any of a large number of acids, of which hydrochloric, sulfuric and maleic acids are preferred examples. It is to be understood that a non-acidic solution of the iodide may also be used, provided that it is a solvent for the hydroxide.

The above process can be readily adapted for transforming an image formed of an iron salt in an unoriented carrier, as, for example, gelatin, to an iodine image, which iodine image can then be transferred to a sheet comprising at least a surface layer of molecularly oriented polyvinyl alcohol. In a preferred adaptation of the transfer process, the iodine is not released until the unoriented carrier is brought into intimate contact with the surface of the molecularly oriented carrier. This modification of the process comprises transforming the image formed of the ferrous salt in the unoriented carrier to ferric hydroxide, as described above, and then immersing the unoriented carrier in a solution of an iodide, which solution does not contain a solvent for the hydroxide. This brings the iodide into intimate contact with the hydroxide image, but because of the absence of a solvent for the hydroxide does not release iodine. The material, for example an acid, for rendering the ferric hydroxide soluble in the iodide solution and therefore for effecting release of the free iodine from said solution is contained in the oriented carrier. The iodine is thus released after the

oriented carrier engages the iodide-imbibed hydroxide image, the iodine image being immediately transferred to the oriented carrier, which has a greater affinity for the iodine than the unoriented carrier. The acid, as for example maleic acid, may be introduced into the oriented carrier as by imbibition or by casting the carrier from a solution containing the acid.

The following examples of the novel processes of the present invention are given for purposes of illustration, but it is to be expressly understood that the proportion 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 photosensitizing solution consisting of:

| | |
|---|---|
| Ferric ammonium citrate | 7 g. in 20 cc. water |
| Ferric ammonium oxalate | 3.75 g. in 20 cc. water |
| Ferric sodium oxalate | 6 g. in 20 cc. water |
| Ferric oxalate | 1 g. |
| Potassium ferricyanide | 3.75 g. in 20 cc. water |
| Water to make 160 cc. | |

is formed by mixing the specified ingredients in the order named, the ferric oxalate being added to the mixture in solid form. A sheet of molecularly oriented polyvinyl alcohol, mounted on a suitable base, for example cellulose acetate, is immersed in this solution for from one to three minutes and is then dried. The photosensitized polyvinyl alcohol layer thus formed is then differentially exposed in any suitable manner, as for example through a photographic negative or transparency which is to be copied. A contact exposure for twenty seconds under a No. R–2 photo-flood lamp gives good results if a negative of medium density is used. By using a more intense light, the exposure time can be materially shortened. The exposed sheet is the immersed in water for approximately one minute and is thereafter dipped for a few seconds in a 1.5% sodium hydroxide solution. The excess sodium hydroxide is then preferably removed by washing the sheet in water, an immersion in a water bath for approximately one minute being sufficient for this purpose. The sheet is then placed in a solution of potassium iodide consisting of

| | Cc. |
|---|---|
| Potassium iodide, 3% solution | 100 |
| Hydrochloric acid 2N solution | 10 |

for approximately thirty seconds. It is preferable to immerse the iodine print thus formed 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*

The molecularly oriented polyvinyl alcohol of Example 1 is sensitized in an aqueous solution comprising a mixture of:

| | |
|---|---|
| Potassium ferricyanide | 40 g. in 250 cc. water |
| Ferric ammonium citrate (green) | 95 g. in 250 cc. water |

by immersion in said solution for approximately one to three minutes and is thereafter dried, exposed and treated in the same manner as the polyvinyl sheet in Example 1.



*Example 3*

The molecularly oriented polyvinyl alcohol of Example 1 is sensitized in an aqueous solution comprising a mixture of:

| | |
|---|---|
| Potassium ferricyanide | 40 g. in 250 cc. water |
| Ferric ammonium citrate (brown) | 110 g. in 500 cc. water |

by immersion in said solution for approximately one to three minutes and is thereafter dried, exposed and treated in the same manner as the polyvinyl sheet in Example 1.

*Example 4*

The molecularly oriented polyvinyl alcohol of Example 1 is sensitized in an aqueous solution comprising a mixture of:

| | Cc. |
|---|---|
| 25% solution of ferric ammonium citrate | 400 |
| 15% solution of potassium ferricyanide | 150 |
| 10% solution of citric acid | 300 |

by immersion in said solution for approximately one to three minutes and is thereafter dried, exposed and treated in the same manner as the polyvinyl sheet in Example 1.

*Example 5*

An unoriented carrier such as paper or gelatin, treated with any of the sensitized solutions described above so as to be rendered light sensitive, is exposed and subjected to the several transformations disclosed in Example 1 for forming a hydroxide image. The carrier containing the hydroxide image is then dipped in a 10% potassium iodide solution which contains no acid. Thereafter a sheet comprising an outer layer of molecularly oriented polyvinyl alcohol containing approximately 10% by weight of maleic acid is brought into contact with said nonoriented carrier whereby iodine is released and is transferred to said sheet to give the desired dichroic image.

The foregoing description of the invention has been given by way of example in connection with materials having a single molecularly oriented layer or surface wherein the iodine image is formed. It is to be expressly understood, however, that the process is equally applicable to the formation of dichroic images in a plurality of molecularly oriented layers of a composite sheet, for example by the simultaneous chemical transformation of an iron salt image formed in each of said molecularly oriented layers. These layers may form the surfaces of the sheet, and the molecular orientation of one layer may be in a direction substantially at right angles to the direction of orientation of the other layer. It is to be understood also that a pair of iodine images formed by means of the process of the present invention in nonoriented carriers may be transferred from said carriers to the molecularly oriented layers of a composite sheet of this character. The images may be of the same object and may bear a predetermined relation to one another. For example, one may be a left-eye image and the other the right-eye image of a stereoscopic pair, so that an observer of the 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.

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 ferric salt to an iodine image 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. Where an oriented carrier is used, i. e., a dichroic image is desired, it is preferable that all those portions of the carrier penetrated by the iodine be molecularly oriented since application of the dichroic material to unoriented portions will produce a non-dichroic light-absorbing stain.

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 having image-carrying layer 11. Fig. 1 portrays a photographic element which has an image-carrying layer initially sensitized with at least one photosensitive ferric salt and in 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 a relatively water-insoluble iron salt which is capable of conversion to the desired oxidizing agent. Fig. 2 discloses the element after further treatment as, for example, with a base such as sodium or potassium hydroxide as heretofore set forth, to convert the image formed of the water-insoluble iron salt to an image comprising the desired oxidizing agent, the latter 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 ferric salt refers to an insolubility such as will prevent water solutions from appreciably dissolving said carrier in the time in which the reactions transforming the iron salt image to the iodine image take place.

It is also to be understood that the term "image comprising iodine" as used in the claims refers to an image formed of iodine or its complexes.

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 an iodine image which comprises providing a suspension of at least one photosensitive ferric salt in a permeable, relatively water-insoluble carrier, differentially exposing the suspension to light to produce a ferrous salt image, removing unexposed ferric salt from the suspension, converting the ferrous salt to an oxidizing agent having a sufficient oxidation potential to release iodine from an iodide, and reacting said oxidizing agent with an iodide in the presence of a solvent for said oxidizing agent to form an image comprising iodine and corresponding to said ferrous salt image.

2. The method of producing an iodine image which comprises providing a suspension of at least one photosensitive ferric salt in a permeable, relatively water-insoluble carrier, differentially exposing the suspension to light to produce a ferrous salt image, removing unexposed ferric salt from the suspension, converting said ferrous salt to ferric hydroxide, and reacting the hydroxide with an iodide in the presence of a solvent for said hydroxide whereby iodine is released to form an image comprising iodine and corresponding to the ferrous salt image.

3. The method of producing an iodine image which comprises providing a suspension of at least one photosensitive ferric salt in a permeable, relatively water-insoluble carrier, differentially exposing the suspension to light to produce a ferrous salt image, removing unexposed ferric salt from the suspension, converting said ferrous salt to ferric hydroxide, and reacting the hydroxide with an iodide in the presence of an acid whereby iodine is released to form an image comprising iodine and corresponding to the ferrous salt image.

4. The method of producing an iodine image which comprises providing a suspension of at least one photosensitive ferric salt in a permeable, relatively water-insoluble carrier, differentially exposing the suspension to light to produce a ferrous salt image, reacting said ferrous salt with a ferricyanide to form an oxidizing iron salt while removing unexposed ferric salt from the suspension, reacting the latter salt with a hydroxide to form ferric hydroxide, and reacting the ferric hydroxide with an iodide in the presence of a solvent for said hydroxide whereby iodine is released to form an image comprising iodine and corresponding to the ferrous salt image.

5. The method of producing an iodine image which comprises providing a suspension of at least one photosensitive ferric salt in a permeable, relatively water-insoluble carrier, differentially exposing the suspension to light to produce a ferrous salt image, reacting said ferrous salt with

a ferricyanide to form an oxidizing iron salt and removing unexposed ferric salt from the suspension by dissolving the same, reacting the latter salt with a hydroxide to form ferric hydroxide, and reacting the ferric hydroxide with an iodide in the presence of an acid whereby iodine is released to form an image comprising iodine and corresponding to the ferrous salt image.

6. The method of producing a dichroic image which comprises providing a suspension of at least one photosensitive ferric salt in a relatively water-insoluble permeable carrier, said carrier comprising a layer of a molecularly oriented, high polymer having an affinity for iodine and adapted to form a dichroic sorption complex therewith, differentially exposing the suspension to light to produce a ferrous salt image, removing unexposed ferric salt from the suspension, converting the ferrous salt to an oxidizing agent having a sufficient oxidation potential to release iodine from an iodide, and reacting said oxidizing agent with an iodide in the presence of a solvent for said oxidizing agent to form an image comprising iodine and corresponding to said ferrous salt image.

7. The method of producing a dichroic image which comprises providing a suspension of at least one photosensitive ferric salt in a relatively water-insoluble permeable carrier, said carrier comprising a layer of a molecularly oriented, high polymer having an affinity for iodine and adapted to form a dichroic sorption complex therewith, differentially exposing the suspension to light to produce a ferrous salt image, converting said ferrous salt to ferric hydroxide, reacting the ferric hydroxide with an iodide in the presence of a solvent for said hydroxide whereby iodine is released to form an image comprising iodine and corresponding to the ferrous salt image, and removing unexposed ferric salt from the suspension at some stage of the method prior to the release of iodine and after the exposure of the carrier to light.

8. The method of producing a dichroic image which comprises providing a suspension of at least one photosensitive ferric salt in a relatively water-insoluble permeable carrier, said carrier comprising a layer of a molecularly oriented, high polymer having an affinity for iodine and adapted to form a dichroic sorption complex therewith, differentially exposing the suspension to light to produce a ferrous salt image, removing the unexposed ferric salt from the suspension, converting said ferrous salt to ferric hydroxide, and reacting the ferric hydroxide with an iodide in the presence of an acid whereby iodine is released to form an image comprising iodine and corresponding to the ferrous salt image.

9. The method of producing a dichroic image which comprises providing a suspension of at least one photosensitive ferric salt in a relatively water-insoluble permeable carrier, said carrier comprising a layer of a molecularly oriented, high polymer having an affinity for iodine and adapted to form a dichroic sorption complex therewith, differentially exposing the suspension to light to produce a ferrous salt image, removing the unexposed ferric salt from the suspension, reacting said ferrous salt with a ferricyanide to form an oxidizing iron salt, reacting the latter salt with a hydroxide to form ferric hydroxide, and reacting the ferric hydroxide with an iodide in the presence of a solvent for said hydroxide whereby iodine is released to form an image comprising iodine and corresponding to the ferrous salt image.

10. The method of producing a dichroic image which comprises providing a suspension of at least one photosensitive ferric salt in a relatively water-insoluble permeable carrier, said carrier comprising a layer of a molecularly oriented, high polymer having an affinity for iodine and adapted to form a dichroic sorption complex therewith, differentially exposing the suspension to light to produce a ferrous salt image, removing the unexposed ferric salt from the suspension, reacting said ferrous salt with a ferricyanide to form an oxidizing iron salt, reacting the latter salt with a hydroxide to form ferric hydroxide, and reacting the ferric hydroxide with an iodide in the presence of an acid whereby iodine is released to form an image comprising iodine and corresponding to the ferrous salt image.

11. The method of producing a dichroic image which comprises providing a suspension of at least one photosensitive ferric salt in a permeable carrier comprising a layer of a molecularly oriented polyvinyl alcohol, differentially exposing the suspension to light to produce a ferrous salt image, removing the unexposed ferric salt from the suspension, converting said ferrous salt to ferric hydroxide, and reacting the ferric hydroxide with an iodide in the presence of an acid whereby iodine is released to form an image comprising iodine and corresponding to the ferrous salt image.

12. The method of producing a dichroic image which comprises providing a suspension of at least one photosensitive ferric salt in a permeable carrier comprising a layer of a molecularly oriented polyvinyl alcohol, differentially exposing the suspension to light to produce a ferrous salt image, removing the unexposed ferric salt from the suspension, reacting said ferrous salt with a ferricyanide to form an oxidizing iron salt, reacting the latter salt with a hydroxide to form ferric hydroxide, and reacting the ferric hydroxide with an iodide in the presence of an acid whereby iodine is released to form an image comprising iodine and corresponding to the ferrous salt image.

13. The method of producing a dichroic image which comprises providing a suspension of at least one photosensitive ferric salt in a permeable, relatively water-insoluble carrier, differentially exposing the suspension to light to produce a ferrous salt image, removing unexposed ferric salt from the suspension, converting the ferrous salt to an oxidizing agent having a sufficient oxidation potential to release iodine from an iodide, immersing said carrier in an iodide, and bringing into face-to-face contact with said carrier, in the presence of a solvent for said oxidizing agent, 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.

14. The method of producing a dichroic image which comprises providing a suspension of at least one photosensitive ferric salt in a permeable, relatively water-insoluble carrier, differentially exposing the suspension to light to produce a ferrous salt image, removing unexposed ferric salt from the suspension, converting said ferrous salt to ferric hydroxide, immersing said carrier in an iodide, and bringing into face-to-face contact with said carrier, in the presence of a solvent for said hydroxide, 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 suspension of at least one photosensitive ferric salt in a permeable, relatively water-insoluble carrier, differentially exposing the suspension to light to produce a ferrous salt image, removing unexposed ferric salt from the suspension, reacting said ferrous salt with a ferricyanide to form an oxidizing iron salt, reacting the latter salt with a hydroxide to form ferric hydroxide, immersing said carrier in an iodide, and bringing into face-to-face contact with said carrier, in the presence of a solvent for said ferric hydroxide, 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.

16. The method of producing a dichroic image which comprises providing a suspension of at least one photosensitive ferric salt in a permeable, relatively water-insoluble carrier, differentially exposing the suspension to light to produce a ferrous salt image, converting said ferrous salt to ferric hydroxide while removing unexposed ferric salt from the suspension, immersing said carrier in an iodide, and bringing a molecularly oriented polyvinyl alcohol into face-to-face contact with said carrier in the presence of an acid.

17. The method of producing a dichroic image which comprises providing a suspension of at least one photosensitive ferric salt in a permeable, relatively water-insoluble carrier, differentially exposing the suspension to light to produce a ferrous salt image, reacting said ferrous salt with a ferricyanide to form an oxidizing iron salt, reacting the latter salt with a hydroxide to form ferric hydroxide, at some stage of the method subsequent to exposure and before dichroic image formation removing unexposed ferric salt from the carrier, immersing said carrier in an iodide, and bringing a molecularly oriented polyvinyl alcohol into face-to-face contact with said carrier in the presence of an acid.

18. In a method of forming an image in a permeable, relatively water-insoluble carrier sensitized to light with at least one photosensitive ferric salt, the steps, after differentially exposing the carrier to light to produce a ferrous salt image therein, which comprise removing unexposed ferric salt from the carrier, converting the ferrous salt to an oxidizing agent having a sufficient oxidation potential to release iodine from an iodide, and reacting said oxidizing agent with



an iodide in the presence of a solvent for said oxidizing agent to form an image comprising iodine and corresponding to said ferrous salt image.

19. In a method of forming an image in a permeable, relatively water-insoluble carrier which is rendered sensitive to light by having at least one photosensitive ferric salt incorporated therein, the steps of forming an iodine image in the carrier after differentially exposing the carrier to light to form a ferrous salt image therein, said steps comprising removing unexposed ferric salt from the carrier, reacting said ferrous salt with a ferricyanide to form an oxidizing iron salt, reacting the latter salt with a hydroxide to form ferric hydroxide, and reacting the ferric hydroxide with an iodide in the presence of an acid whereby iodine is released to form an image comprising iodine and corresponding to the ferrous salt image.

20. In a method of converting to a dichroic image, a ferrous salt image formed by differentially exposing to light a relatively permeable, water-insoluble carrier comprising a molecularly oriented polymeric plastic which has an affinity for iodine and is adapted to form a dichroic sorption complex therewith and which is rendered light sensitive with at least one photosensitive ferric salt, the steps comprising removing unexposed ferric salt after the formation of the ferrous salt image, converting the ferrous salt formed by the exposure of the carrier to an oxidizing agent having a sufficient oxidation potential to release iodine from an iodide, and reacting said oxidizing agent with an iodide in the presence of a solvent for said oxidizing agent to form an image comprising iodine and corresponding to said ferrous salt image.

21. A method of forming a dichroic image which comprises differentially exposing a permeable, relatively water-insoluble carrier which is sensitized with at least one photosensitive ferric salt to form a ferrous salt image, removing unexposed ferric salt from the carrier, converting the ferrous salt to an oxidizing agent having a sufficient oxidization potential 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 causing the iodine to permeate into a molecularly oriented, polymeric plastic to form in the oriented plastic a dichroic sorption complex in iodine.

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