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SURFACE DEFORMABLE IMAGING PROCESS AND MEMBER

Roger N. Ciccarelli, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

No Drawing. Continuation-in-part of application Ser. No. 670,824, Sept. 15, 1967, which is a continuation-in-part of applications Ser. No. 388,322 and Ser. No. 388,323, both Aug. 7, 1964, all now abandoned. This application Nov. 30, 1970, Ser. No. 93,837

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ABSTRACT OF THE DISCLOSURE

An improved surface deformable imaging process is disclosed. A distinct humidity insensitive layer comprising a polar material and having a thickness of up to about 0.3 micron (μ) is deposited on the surface of a thermoplastic composition. An electrostatic charge pattern is produced on the coated surface of the thermoplastic. When exposed to a softening environment the surface of the thermoplastic deforms in an imagewise manner corresponding to the charge pattern.

BACKGROUND OF THE INVENTION

This application is a continuation-in-part of copending application Ser. No. 670,824 filed Sept. 15, 1967, which in turn is a continuation-in-part of applications Ser. Nos. 388,322 and 388,323 filed Aug. 7, 1964, all now abandoned, and relates to electrophotography and more specifically to the electrostatic recording of surface deformable materials.

In the most commonly practiced forms of electrophotography, an electrostatic latent image is formed on an insulating surface and then rendered visible. The electrostatic images may be produced by direct charge deposition as by charging through a stencil or the electrostatic image may be formed by the combined action of an electric field and a pattern of light and shadow on a photoconductive insulating layer. The latent image produced is converted into a visible image either simultaneously or subsequent to the latent image formation by the selective deposition of finely divided electroscopic developing particles. After the visible image is formed it is usually fixed in place on the surface of the photoconductive insulator or the developer particles representing same may be transferred to a secondary substrate and fixed thereto depending upon whether or not the photoconductive insulator is reusable. For further discussion with respect to the conventionally known electrophotographic imaging process reference is made to U.S. Pat. No. 2,-297,691.

The application of electrostatic principles as above described have been extended to imaging systems whereby the latent image produced may be made visible by the selective surface deformation of the material upon which the latent image has been formed. When the insulating material comprises a thermoplastic the charge pattern formed on the surface thereof may be developed by softening the thermoplastic upon exposure to any suitable softening environment such as heat or solvent vapor exposure until the electrostatic forces of the charge pattern exceed the surface tension forces of the film. When this critical or threshold condition is reached, small surface folds or wrinkles are formed on the thermoplastic material. Once the image is made visible by producing the surface deformations, it may then be fixed by allowing the deformed film to harden, usually accomplished by removing the respective member from the softening environment. The image may be erased and the film re-

turned to its original condition by re-exposing the imaged material to the softening environment.

Many thermoplastic materials have been found suitable for adaptation to the surface deformable imaging process. Other materials have been found to be unsuitable or otherwise incapable of responding to the conditions described above to produce acceptable images even though thermoplastic in nature. Many factors play a role in the desirability of thermoplastic materials for surface deformation imaging such as their physical, chemical and electrical properties, as well as thickness requirements. As a result, the choice of surface deformable materials has been substantially restricted.

It is, therefore, an object of this invention to provide a surface deformable imaging system which will overcome the above noted disadvantages.

It is a further object of this invention to provide a process which will allow for the use of a wider selection of surface deformable materials capable of producing images of substantially higher quality.

Another object of this invention is to increase the selection of materials adaptable for use as a surface deformable recording medium.

Still a further object of this invention is to provide a novel process for producing images of comparatively high quality on materials previously found to be unsuitable for forming surface deformable images.

Still another object of this invention is to provide a novel surface deformable imaging member.

Yet another object of this invention is to provide a novel surface deformable composition adapted for use as an image deformable recording medium.

Still yet a further object of this invention is to provide a novel method of improving the surface deformable imaging characteristics of existing thermoplastic materials.

Again, still a further object of this invention is to provide a process which will permit the use of a substantially broader selection of relatively thin materials for surface deformation imaging.

Again, a further object of this invention is to provide a process whereby the surface properties of a broad range of thermoplastic materials may be substantially altered.

Yet still another object of this invention is to provide a novel method for enhancing the properties of materials for use in a surface deformable imaging process.

Another object of this invention is to provide a novel surface deformable imaging process.

SUMMARY OF THE INVENTION

The foregoing objects and others are accomplished in accordance with the present invention, generally speaking, by providing a method for improving the image-forming capabilities of thermoplastic materials as hereinafter described as related to a surface deformable imaging process. To the surface of a thermoplastic composition is introduced a thin, separate and distinct film or layer of material coated to a thickness of no greater than about 0.3 micron. The surface layer deposited on the thermoplastic will be such as to render the underlying bulk thermoplastic relatively impermeable to charge and/or ions when the latter is exposed to a softening environment. The surface layer will comprise a polar material which is humidity insensitive i.e. water vapor will not adversely affect the material. When used in the course of the present invent the expression polar material is meant to include compositions containing polar groups which are defined as electrically unsymmetrical functional groups having a measurable dipole moment attached to a polymer chain. The bulk thermoplastic composition will generally

have a resistivity of about 10^{10} ohms-cm. or greater when the latter is exposed to softening conditions, such as at its deformation temperature. The surface layer introduced is either substantially continuous overlying at least a portion of the bulk thermoplastic or discontinuous if deposited in the form of a dot pattern. As a result of the presence of the distinct layer or film of polar material on the bulk thermoplastic, the surface deformable properties of the latter are substantially enhanced.

It has been determined in the course of the present invention that upon introducing a distinct layer of a polar, humidity insensitive material to the surface of a thermoplastic composition to a thickness of no greater than about 0.3 micron, that the surface deformable imaging properties of the thermoplastic material can be substantially enhanced. The presence of the layer of the polar material on the surface of the thermoplastic renders the bulk material relatively impermeable to charge and/or ions during exposure of the bulk material to the image developing softening environment. The increase in mechanical flow properties or decrease in viscosity takes place faster than the increase in the charge decay or the decrease in resistivity due to the presence of the layer of polar material thus preserving the integrity of the surface layer during the formation of the deformation image. Continued exposure to the softening environment will bring about the complete dispersion of the surface layer in the bulk material. This, however, will not necessarily affect the integrity of the image produced. For purposes of recycling it is desirable that the identity of the surface layer formed be completely obliterated thus eliminating any memory effect upon subsequent images. This is assured during the image erasing step further discussed below. A technique is therefore provided whereby the imaging capabilities of thermoplastic materials may be substantially enhanced while still maintaining system flexibility allowing for the formation of surface deformation images and subsequent elimination or erasing of the images to return the thermoplastic to its original state.

The concept of the present invention may be utilized to provide a variety of imaging techniques which lends considerable flexibility to surface deformation imaging processes. In one such imaging process a thermoplastic composition of the nature hereinafter described is coated on the surface of a photoconductive insulating material. A layer of the polar material of the present invention is coated to a thickness not to exceed 0.3 micron on the surface of the thermoplastic material. The coated surface is uniformly charged and selectively exposed to actinic radiation in the form of an image pattern to produce an electrostatic latent image on the coated surface of the thermoplastic composition. The resulting member is exposed to a softening environment, such as heat, whereby the surface of the thermoplastic material deforms a deformation pattern corresponding to said latent image. Upon removal from the softening environment the surface deformation image formed is fixed in the surface of the thermoplastic material. This process utilizes electrophotographic principles for forming the electrostatic charge pattern which ultimately represents the surface deformation image formed. If so desired the thermoplastic material itself may be photoconductive in which instance a conventional binder composition such as disclosed in U.S. Pat. 3,121,006 may be utilized whereby photoconductive pigment particles may be dispersed in a thermoplastic resinous binder. The remaining process steps as described above would be the same. If the photoconductive member is not provided in one of the forms set forth above, then the electrostatic charge pattern may be created on the coated thermoplastic by any one of a number of known techniques such as applying a charge through a stencil or by applying electrostatic charge by way of a shaped electrode.

In a second imaging process utilizing the concept of the present invention the surface layer is deposited on the thermoplastic in an image-wise configuration. The thermoplastic material is then uniformly charged and exposed to a softening environment, so as to selectively deform in those areas where the film has been deposited thereby producing a deformation pattern corresponding to the selective deposition of the surface layer.

In a third process, a surface layer as above described is uniformly formed on the surface of a thermoplastic composition. An additional surface forming step is instigated whereby the thickness of the surface layer is increased in an imagewise manner above the 0.3 micron critical limitation. A uniform electrostatic charge is then applied to the surface and the member exposed to a softening environment whereby the surface deforms in those areas where the surface layer is present at a thickness less than 0.3 micron.

In a fourth imaging process the surface of the thermoplastic material is uniformly coated with the surface layer to a thickness not exceeding the 0.3 micron critical limitation and the resulting surface uniformly charged and exposed to a softening environment so as to form a uniform deformation pattern on the surface of the thermoplastic. An imagewise pattern of the polar material is then deposited on the deformed surface exceeding the 0.3 micron critical limitation. The thermoplastic material is then re-exposed to a softening environment for a period of time which enables the surface film to disassociate, erasing that portion of the deformed surface not exhibiting the layer exceeding the critical limitation. Any other similar imaging process may be used as described above in relation with the present invention so as to achieve the purposes discussed.

For purposes of the present invenion the thickness of the thermoplastic composition prepared for imaging will range anywhere from about 0.5 to 100 microns. However, as the thickness of the thermoplastic material increases the resolution of the deformation images produced will decrease inasmuch as the depressions formed become quite large in comparison with those formed when the thermoplastic material is kept at the lower parameter of the range recited. For optimum results it is preferred that the thermoplastic material be maintained at a thickness of about 1 or 2 microns from the point of view of producing an image of high quality with acceptable resolution plus being practical from an operational view point. As stated. above the presence of the surface layer impedes the charge decay during the softening of the thermoplastic material thus maintaining the force necessary to cause surface deformation. The surface layer will have a thickness which will range from a mono layer or monomolecular layer to about 0.3 micron. A most desirable effect is realized when the surface layer is regulated to about 0.1 micron. By exceeding the critical thickness of the surface layer a convenient method for fixing the surface image is provided. This effect is utilized in the imaging of surface deformable materials as set forth in the above described processes. The surface layer is formed from a polar material which is humidity insensitive.

The thermoplastic composition of the present invention may be a self-supporting material but preferably will include a suitable support element such as a conductive base and/or a photoconductive substrate. The support substrate may include a metal plate, conductive glass such as tin oxide coated glass, various conductive plastics, and the like.

The recording member of the present invention will include an insulating layer of a thermoplastic material the surface of which following the deposition of the polar material may be deformed when exposed to a softening environment in response to the necessary established electrical forces. Any suitable material may be used as the thermoplastic composition of the present invention. Typical non-polymeric materials include esters of abietic acid made from the condensation of abietic acid and alcoholic

compounds such as ethylene glycol, propylene glycol, butylene glycol, xylene glycol, pentaerythritol, glycerine and mixtures thereof. The term alcohol when used will be intended to include mono, di and poly alcohols. The term esterification when used includes polyesterification. Other typical nonpolymers include sucrose esters such as sucrose octabenzoate, sucrose octaacetate and mixtures thereof. Typical polymeric materials include polystyrene, polyvinyl chloride, polyvinyl acetate, polyvinyl alcohol, copolymers made from styrene and other materials such as vinyltoluene, methylstyrene, butyl-methacrylate, butadiene, styrene-methacrylate-butadiene terpolymers, organopolysiloxanes such as polydiphenylsiloxane, methyl-phenyl polysiloxane, polyesters such as acrylic esters, bisphenol A type polyesters and copolymers, chlorinated paraffins, polyvinyl chloride copolymers, acrylic cooplymers, indene polymers, phenols such as phenolaldehyde resins, complex hydrocarbon polymers such as hydrogenated polyethylene, polyterpenes, and mixtures thereof. Any of the above non-polymeric and polymeric materials may be combined in mixtures or copolymerized when desirable and utilized as the thermoplastic material of the present inveniton.

Any suitable polar compound as above described may be used in the process of the present invention. The polar compounds have polar groups attached to the polymer chains. Typical compounds include halides such as carbonchlorine compounds, esters, eters, epoxy, quaternary amines, alcoholic hydroxyl compounds, organic acids such as acidic hydroxyl compounds for example phenolic and cyanuric acid, sulfonic acid, carboxylic acid, and the metal salts of these organic acids, such as lithium, sodium, potassium, magnesium, calcium, titanium, chronium, iron, cobalt, nickel, copper, silver, zinc, cadmium, aluminum, tin, arsenc, selenium, tellurium, hydroperoxides, and peroxides. Other typical materials include polymers having incorporated therein metallic salts. The surface layer of the polar material may be applied by any suitable technique such as spraying, dip coating and doctor blade application.

The surface deformation of the present invention may be brought about by the application of heat, thereby raising the temperature of the thermoplastic above its softening point or by exposing the particular material to a vapor environment of a solvent for the thermoplastic so as to produce a similar effect. When removed from the softening environment the thermoplastic returns to its original solid state, fixing the surface deformations. To erase the image and restore the thermoplastic to its initial unimaged form, the imaged member is again reexposed to a softening environment of the nature described. Inasmuch as the electrical forces are no longer present, upon softening the image is destroyed. Exposure to the softening environment is sustained until the surface layer becomes completely disassociated and uniformly dispersed in the underlying bulk material. The imaging member is then ready for re-cycling.

When a photoconductive member is required to practice an imaging process based upon the present invention any suitable photoconductive pigment particle may be incorporated in the thermoplastic material as appropriate. Typical inorganic photoconductive materials include sulfur, selenium, zinc sulfide, zinc oxide, cadmium selenide, cadmium sulfoselenide and various selenium alloys. Typical organic photoconductive materials include sensitized polyvinylcarbozole, anthracine, anthraquinones and phthalocyanine pigments. Where desirable any combinaton or mixture of the above materials may be used. Where a photoconductive layer is used as a separate element of the recording member apart from the thermoplastic surface deformable material, it may take the form of a homogeneous photoconductor such as selenium or one may use a binder plate of the nature described in U.S. Pat. Nos. 3,21,006 and 3,121,007.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

To further define the specifics of the present invention, the following examples are intended to illustrate but not limit the particulars of the present system. Parts and percentages are by weight unless otherwise indicated.

Example I

About 0.1 mole (18.4 grams [g.]) of cyanuric chloride is dissolved in about 125 milliliters [ml.] of Baker Reagent acetone. About 0.3 mole (83.6 g.) of m-(m-phenoxy phenoxy) phenol is dissolved in an aqueous solution of sodium hydroxide comprising about 125 ml. of deionized water and about 12 g. of sodium hydroxide under a nitrogen blanket. The sodium m-(m-phenoxy phenoxy) phenate is added to the cyanuric acid chloride-acetone solution at about −10° C. dropwise over a period of one hour. After this addition, the mixture is stirred for about an hour at about −10° C., then for about two hours at room temperature, and finally for about four hours at reflux (57° C.). About 300 ml. of toluene is added and the water decanted. The toluene solution is washed with about 200 ml. of a 2% sodium carbonate solution, twice with deionized water, with about 200 ml. of a 5% hydrochloric acid solution, and finally twice with deionized water. The toluene solution is dried overnight over a Molecular Sieve 4A. The toluene is removed in a flash evaporator while heating to a temperature of about 150° C. at about 4 mm. mercury to yield 1,3,5-tri(m-phenoxy-phenoxy-phenyl) cyanurate which will be referred to as compound A.

About 0.1 mole (18.4 g.) of cyanuric chloride is dissolved in about 125 ml. of Baker Reagent acetone. About 0.2 mole (55.6 g.) of m-(m-phenoxy phenoxy) phenol is dissolved in an aqueous sodium hydroxide solution comprising about 125 ml. of water and 12 g. of sodium hydroxide under a nitrogen blanket. The sodium m-(m-phenoxy phenoxy) phenate is added to the cyanuric chloride-acetone solution at about −10° C. dropwise over a period of about one hour. The mixture is stirred for about one hour at about −10° C., then about 4 g. of sodium hydroxide in 50 ml. of water is added. The mixture is then stirred for about two hours at room temperature, and finally for about four hours at reflux (57° C.). About 300 ml. of toluene is added and the water removed by decantation. The toluene solution is washed twice with water. The toluene solution is dried overnight over a Molecular Sieve 4A and finally the toluene is removed by flash evaporation to yield the sodium salt of compound A.

Equal parts by weight of compoud A and its sodium salt as prepared above are mixed to produce a toluene solution. The resulting solution is spray coated to a thickness of about 0.1μ over a 2μ layer of Piccotex 100, a substituted styrenevinyltoluene copolymer, available from the Pennsylvania Industrial Chemical Corporation. The solvent evaporates during the coating step. The Piccotex resin is precoated on an arsenic-selenium photoconductive plate. A charge of about 160 volts is applied across the resin coating and the charged plate exposed selectively to an electromagnetic radiation source so as to selectively discharge the member to produce an electrostatic charge pattern. The image bearing member is exposed to a vapor environment comprising toluene vapors. The resin softens and the surface deforms in an imagewise manner corresponding to the charge pattern. A light scattering image is clearly visible. Upon removal from the vapor environment the image is frozen in place.

Example II

The process of Example I is repeated except for the proportions at which the compounds are blended. The coating solution is prepared by blending 75 parts by weight of compound A with 25 parts by weight of the sodium salt of a compound A in toluene. The remaining steps of

the process are the same with the formation of a deformation pattern.

The process is repeated with the exclusion of the surface layer. A very faint image is detected on the resin demonstrating the image enhancement achieved by the presence of the surface layer.

Example III

The process of Example I is repeated with the exception that in the preparation of the salt, instead of adding 4 g. of sodium hydroxide, 2.4 g. of lithium hydroxide is added. A surface deformation image is produced as identified by light.

The process is repeated, however, in this instance the surface layer is coated to a thickness of about 0.4μ. Repeating the imaging steps failed to produce the previously identified surface deformation image.

Example IV

The process of Example III is repeated with the changes in proportions made as set out in Example II. Similar results are obtained. When a surface layer exceeding 0.3μ is formed the light scattering effect could not be achieved.

Example V

About 0.085 mole (10 g.) of alphamethylstyrene and about 100 ml. of tetrahydrofuran are distilled into a reaction vessel. This mixture is then cooled to about −78° C. with a Dry-Ice acetone bath. Initiation is accomplished with the addition of about 3.1 ml. of n-butyllithium (1.6 molar [m.] in n-hexane). The reaction mixture is removed from the bath and allowed to warm to room temperature until a deep red color appears. It is then cooled with Dry-Ice acetone bath and stirred overnight. Termination is accomplished by rapidly bubbling dry carbon dioxide through the mixture while stirring. The polymer is isolated by desolvation under vacuum. It is then redissolved in toluene and precipitated from a large excess of spectra grade methanol. Filtration and drying yield a product of about 5 g. polymer. The polymer is placed in solution by dissolving in toluene and spray coated to a thickness of about 0.2μ on to a 1μ layer of alphamethylstyrene coated on an aluminum substrate. An electrostatic latent image is produced by applying charge through a stencil so as to establish a potential of about 75 volts across the layer of thermoplastic. The imaged member is placed on a hot plate at a temperature of 75° C. to produce a deformation light scattering image corresponding to the latent image.

The process is repeated with the exclusion of the surface layer. Using light scattering techniques, the surface deformations were not identifiable.

Example VI

About 600 g. of diphenyl ether is heated to about 200° C. To this is added a solution of about 1.77 moles (182 g.) of styrene and about 0.194 mole (16.6 g.) of methacrylic acid, dropwise, over a period of about two hours. After heating an additional hour, the mixture is cooled to room temperature, then dropwise added to a large excess of methanol. Filtration and drying yield about 130 g. of polymer. The polymer is placed in solution with toluene and dip coated to a thickness of about 0.1μ onto a 2μ thick layer of Staybelite Ester 10, a rosin ester available from the Hercules Powder Company. The latter resin is precoated on a selenium photoconductive plate. The surface of the coated resin is uniformly charged to a potential of about 150 volts across the resin and selectively exposed to actinic radiation to produce a charge pattern. The imaged member is placed on a hot plate at 65° C. to produce a deformation image. The image is frozen in place on cooling.

Example VII

The copolymer as produced in Example VI is reacted with about 10 mole percent of sodium methoxide in toluene. The polymer salt is isolated by precipitation from isopropyl alcohol. The product so obtained is placed in solution using tetrahydrofuran as the solvent. The polymer is coated on the surface of a 2μ thick Piccotex member as in Example I to a thickness of 0.2μ. The remainder of the process is the same as in Example I. Light scattering images are obtained. Upon cooling the image is frozen in place.

Example VIII

The acid copolymer produced in Example VI is reacted with a 10 mole percent excess of lithium hydroxide monohydrate in toluene. The reaction is driven to completion by azeotroping of the theoretical quantity of water. The polymer salt is isolated by desolvation under vacuum. The material so produced is coated and imaged as in Example VII to produce a deformation image pattern.

Example IV

A 0.06 micron coating of Butvar B–76, a polyvinyl butyral available from Monsanto Chemical Corporation having a molecular weight of about 50,000 is placed over a 4 micron Piccotex 100 layer (as defined above) by solution dip coating. The Piccotex layer is supported by a glass slide. After drying for about 1 hour at about 70° C. the slide is placed in a Xerox Model D processor, charged to 280 volts and placed on a 90° C. hot plate. Surface deformation occurs as evidenced by a reflection density of about 1.2.

Example X

A slide comprising a 4 micron Piccotex 100 layer is coated with a 0.01 micron coating of Bakelite CKR2400, a phenolformaldehyde resin available from the Union Carbide Chemical Company by solution dip coating. After drying for about 1 hour at about 70° C. the slide is placed in a Xerox Model D processor, charged to 160 volts and placed on a 90° C. hotplate. Surface deformations are formed as evidenced by a reflection density increase of from 0 to about 0.8. Upon cooling the deformations are frozen in the surface.

Example XI

A 0.2 micron layer of Krylon, an acrylic ester available from Krylon, Inc., is spray coated onto the surface of a Piccotex 100 slide. The Piccotex layer is about 4 microns thick. After drying for about 1 hour at about 70° C., the slide is placed in a processor as described above, charged and placed on a hot plate at 90° C. A light scattering uniform image is obtained which is fixed by cooling.

Example XII

A 50 weight percent solution of Piccotex 100 in xylene is coated onto an aluminum foil using a Boston Bradley draw-down coated with a gap setting of 4 mils. After drying one hour at 70° C. the film thickness is measured with a Permascope and found to be about 30 microns. The foil is then divided into two slides. One of the slides is corona charged to about 380 volts and placed on a 90° C. hot plate. Some surface deformation occurs as measured by a reflection density of 0.2. The second slide is coated with a layer of polyvinyl butyral to a thickness of about 0.2 micron. The slide is charged to 380 volts and placed on a 90° C. hot plate. A substantially enhanced image is obtained as indicated by a reflection density of 1.1.

Example XIII

A 50 weight percent solution of Amoco 18 (polyalphamethylstyrene) in xylene is coated onto aluminum foil using a Boston-Bradley draw-down coater with a gap setting of 4 mils. After drying at 70° C. the film thickness is measured with a Permascope and found to be about 35 microns. The film is then divided into two slides. One of the slides is corona charged to 480 volts and then placed on a 93° C. hot plate. Some slight wrinkling of the surface occurs as measured by reflection density of 0.3. The remaining slide is coated with a layer of the phenolform-

aldehyde resin of Example X to a thickness of about 0.15 micron. The slide is charged to about 480 volts and placed on a 93° C. hot plate. The surface deformations produced yield a reflection density of 1.0.

Example XIV

About 100 grams of sucrose octabenzoate is dissolved in about 200 cc. of toluene and coated onto aluminum foil using a dip coating process. After drying for about one hour at about 70° C. the film thickness is measured with a Permascope and found to be about 15 microns thick. The film is divided into slides and one of the slides is corona charged to 300 volts and then placed on a 90° C. hot plate. Some slight surface deformation occurs as measured by a reflection density of 0.4. A second slide is coated with Krylon to a thickness of about 0.3 micron. The slide is charged to about 300 volts and placed on a 90° C. hot stage. Good frost is obtained as indicated by a reflection density of 1.2.

Example XV

A 12 micron coating of polydiphenylsiloxane is prepared on aluminum foil using a dip coater. After being dried and divided one of the slides is then corona charged to 380 volts and then placed on a 60° C. hot plate. Some slight wrinkling occurs as measured by a reflection density of 0.1. The other slide is coated with Krylon to a thickness of about 0.2 micron. The slide is charged to about 380 volts and placed on a 60° C. hot plate. The surface deformations obtained show a reflection density of 1.2.

Although the present examples are specific in terms of conditions and materials used, any of the above listed typical materials may be substituted when suitable in the above examples with similar results. In addition to the steps used to carry out the process of the present invention, other steps or modifications may be used if desirable. For example, two chemically distinct materials may be mixed together and dip coated onto a plate from the same solvent. When the materials are properly chosen such as an organic polysiloxane mixed with a polyester, the material which is to form the surface layer will migrate to the top of the configuration. In addition, other materials may be incorporated in the system of the present invention which will enhance, synergize or otherwise desirably affect the properties of the systems for their present use. For example, where utilized, the spectrosensitivity of photoconductors may be altered by the addition of photosensitizing dyes.

Those skilled in the art will have other modifications occur to them based on the teachings of the present invention. These modifications are intended to be encompassed within the scope of this invention.

What is claimed is:

1. A surface deformable recording member comprising a support substrate having superimposed thereon a uniform layer of a thermoplastic material having a resistivity of about 10^{10} ohms-cm. under softening conditions for said thermoplastic, said thermoplastic having on the surface thereof to be imaged a separate and distinct surface layer of a metallic salt of 1,3,5-tri(m-phenoxy-phenoxy-phenyl) cyanurate having a thickness of up to about 0.3 micron.

2. The member as disclosed in claim 1 wherein said thermoplastic is photoconductive.

3. The member as disclosed in claim 1 wherein said thermoplastic has a thickness of from about 1 to 2 microns.

4. The member as disclosed in claim 1 wherein said metallic salt is a sodium salt.

5. The member as disclosed in claim 1 wherein said metallic salt is a lithium salt.

6. A surface deformable imaging process comprising providing an imaging member which comprises a uniform layer of a bulk thermoplastic having a resistivity of about 10^{10} ohms-cm. at its softening temperature, coating a separate surface layer to a thickness of up to about 0.3 micron on the surface to be imaged of said bulk thermoplastic, said surface layer comprising a metallic salt of 1,3,5-tri-(m-phenoxy-phenoxy-phenyl) cyanurate, forming an electrostatic charge pattern on said surface layer and exposing said thermoplastic to a softening environment such that it deforms in configuration with said charge pattern.

7. The process as disclosed in claim 6 wherein said bulk thermoplastic is photoconductive.

8. The process as disclosed in claim 7 wherein said thermoplastic is superimposed on a conductive substrate.

9. The process as disclosed in claim 6 wherein said metallic salt is a sodium salt.

10. The process as disclosed in claim 6 wherein said metallic salt is a lithium salt.

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