Nov. 14, 1961 W. G. VAN DORN ET AL 3,008,825

XEROGRAPHIC LIGHT-SENSITIVE MEMBER AND PROCESS THEREFOR

Filed Nov. 20, 1957 4 Sheets-Sheet 1

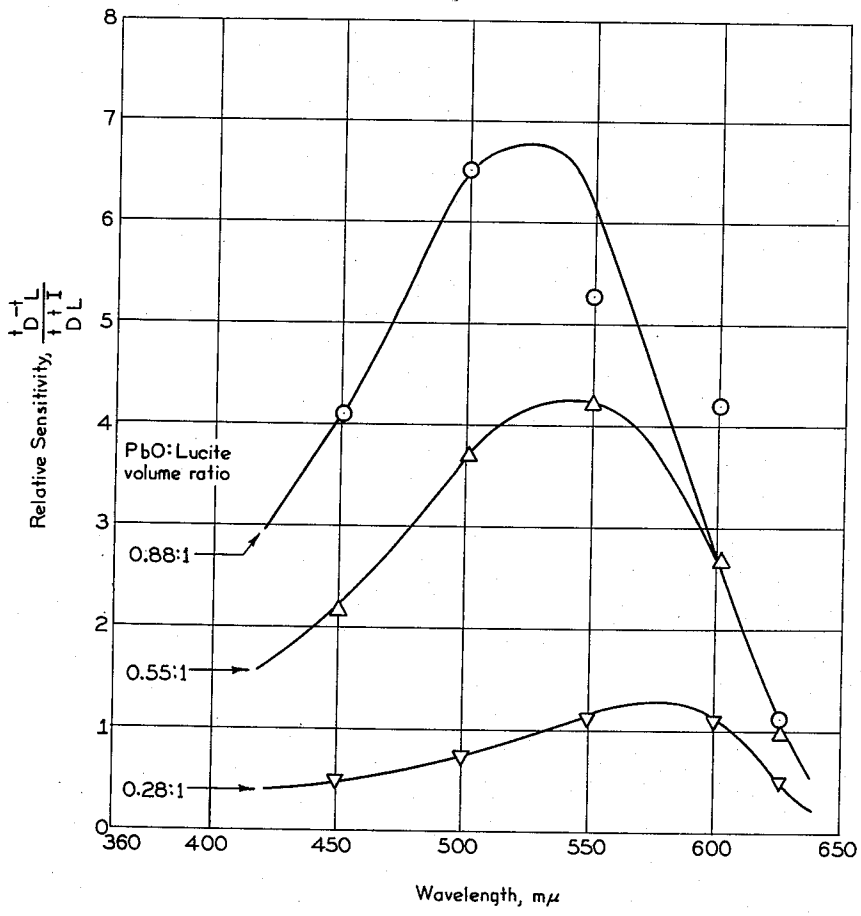

FIG. 1

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XEROGRAPHIC LIGHT-SENSITIVE MEMBER AND PROCESS THEREFOR

Filed Nov. 20, 1957 4 Sheets-Sheet 2

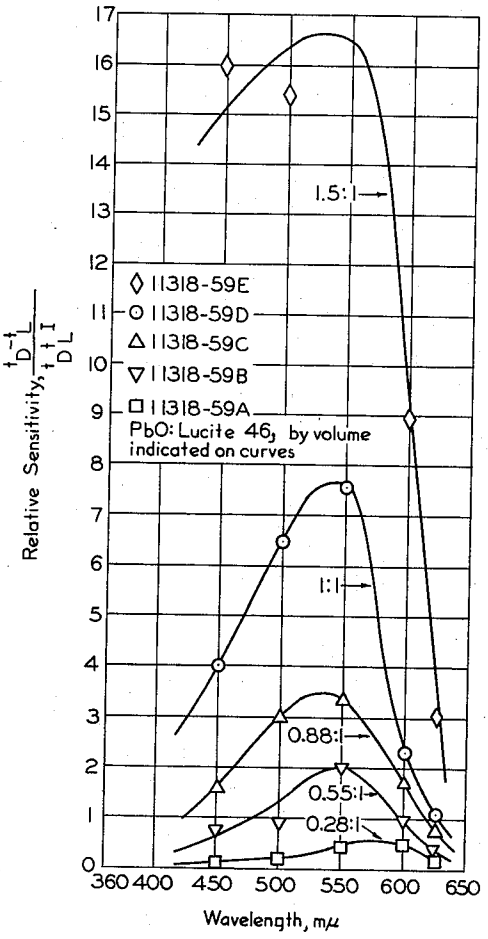

FIG. 2

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XEROGRAPHIC LIGHT-SENSITIVE MEMBER AND PROCESS THEREFOR

Filed Nov. 20, 1957 4 Sheets-Sheet 3

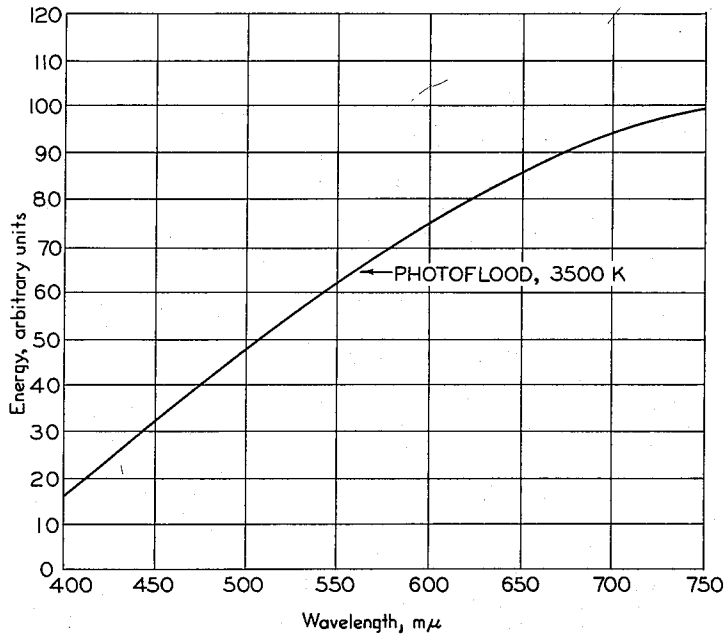

FIG. 3

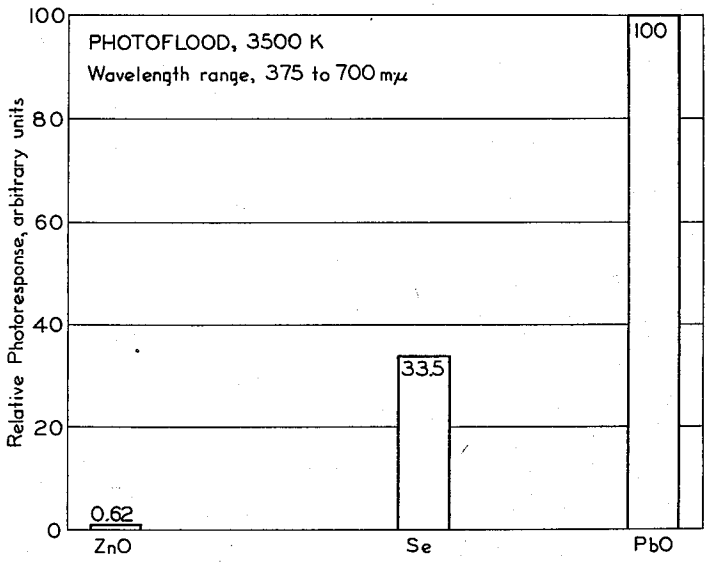

FIG. 4

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Nov. 14, 1961 W. G. VAN DORN ET AL 3,008,825

XEROGRAPHIC LIGHT-SENSITIVE MEMBER AND PROCESS THEREFOR

Filed Nov. 20, 1957 4 Sheets-Sheet 4

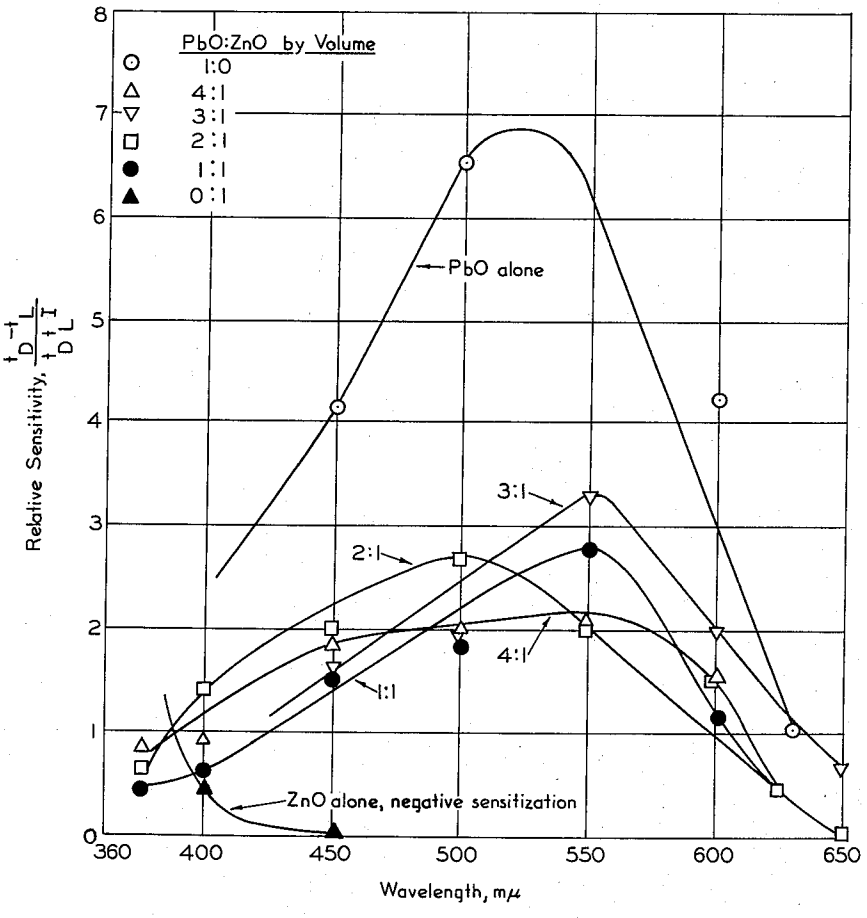

FIG. 5

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United States Patent Office 3,008,825 Patented Nov. 14, 1961

3,008,825

XEROGRAPHIC LIGHT-SENSITIVE MEMBER AND PROCESS THEREFOR

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Filed Nov. 20, 1957, Ser. No. 697,602
9 Claims. (Cl. 96—1)

This invention relates in general to xerography and in particular to xerographic plates and a xerographic process using such plates. More specifically, the invention relates to a new xerographic member comprising a relatively conductive backing having on at least one surface thereof a coating of finely ground tetragonal lead monoxide dispersed in a high electrical resistance binder.

In the xerographic process as described in U.S. 2,297,691 to C. F. Carlson, a base plate of relatively low electrical resistance such as metal, paper, etc. having a photoconductive insulating surface thereon is electrostatically charged in the dark. The charged coating is then exposed to a light image. The charges leak off rapidly to the base plate in proportion to the intensity of light to which any given area is exposed. After such exposure the coating is contacted with electrostatically charged marking particles in the dark. These particles adhere to the areas where the electrostatic charges remain forming a powder image corresponding to the electrostatic image. The powder image can then be transferred to a sheet of transfer material resulting in a positive or negative print, as the case may be, having excellent detail and quality. Alternatively, where the base plate is relatively inexpensive, as of paper, it may be desirable to fix the powder image directly to the plate itself.

As disclosed in Carlson, suitable photoconductive insulating coatings comprise anthracene, sulfur or various mixtures of these materials as sulfur with selenium, etc. to thereby form uniform vitreous appearing coatings on the base material. These materials have a sensitivity largely limited to the green, blue or near ultraviolet and have a further limitation of being only slightly light sensitive. Consequently, there has been an urgent need for improved photoconductive insulating materials.

The discovery of the photoconductive insulating properties of highly purified vitreous selenium has resulted in this material becoming the standard in commercial xerography. The photographic speed of this material is many times that of the prior art photoconductive insulating materials. However, vitreous selenium suffers from two serious defects: First, its spectral response is very largely limited to the blue or near ultraviolet; and, second, the preparation of uniform films of vitreous selenium has required highly involved and critical processes, particularly vacuum evaporation. Furthermore, vitreous selenium by its nature requires a relatively firm and uniform support such as a continuous plastic or metal base. This, together with the high cost of selenium itself has rendered impractical the development of a disposable xerographic plate such as a paper base plate using this material.

The next advance in xerographic plates occurred with the discovery of the "binder" plate as described in U.S. 2,663,636 to A. E. Middleton. As described therein, it was found that a xerographic sensitive member could be prepared by intimately mixing and grinding together a photoconductive insulating material and a high electrical resistance binder. Such a mixture is suitable as the photoconductive insulating layer in the xerographic plate and may be coated on any suitable support material offering a relatively lower electrical resistance such as metal, paper, suitable plastics or conductively coated glass, plastics, etc.

Xerographic plates having photoconductive insulating

layers prepared in accordance with the teachings of Middleton (which plates are hereinafter referred to as "binder plates") have generally been characterized by relatively low photographic speed and relatively limited spectral response for any particular pigment. However, the variety of materials available makes possible the selection of any desired specific spectral sensitivity. In general, the sensitivity of unmodified binder plates to photoflood illumination compared to a commercial vitreous selenium plate ranges from about 10% to a fraction of 1% of the sensitivity of the vitreous selenium plate. No single component photoconductor either in a binder plate or in a vitreous xerographic plate has been found which even remotely approaches the spectral sensitivity of vitreous selenium. Accordingly, for regular xerographic processes vitreous selenium has remained the material of choice. However, for those uses which require the special physical properties or low cost made possible by the binder plate (as in a disposable paper backed plate), the material which has become the standard in the preparation of commercial binder plates has been zinc oxide.

Now, in accordance with this invention, there has been found a pigment which when incorporated in a binder plate results in a xerographic plate so outstandingly sensitive as to be truly unique. This novel plate is prepared by intimately mixing and grinding together tetragonal lead monoxide in a high electrical resistance binder. Lead forms a variety of oxides, some of which have more than one crystalline form. These oxides, in general, are either inoperable in xerographic plates or have exhibited light sensitivities in the same class as the photoconductors well known to the art. It has now been discovered, however, that the tetragonal form of the monoxide of lead is truly outstanding in its light sensitivity. The regular lead monoxide of commerce is a yellow pigment which has an orthorhombic crystalline structure. The tetragonal crystalline form (although sometimes called yellow in the literature) has a color ranging from red to tan, the large crystals being carmine red and small crystals being tan. The unique photoconductivity of lead monoxide is limited to the tetragonal crystalline type. Xerographic plates incorporating this pigment are several times as sensitive to light from a photoflood lamp as vitreous selenium and are virtually panchromatic over the visible spectrum.

The plates of the instant invention may be prepared by any of the processes used to prepare binder plates in the prior art. Thus, the pigment-binder composition with a suitable solvent for the binder may be flowed on the base material or otherwise coated on the base as by dipping, whirling, spraying, the use of a doctor blade, dip roll, etc. Alternatively, the composition may be rendered flowable using a thermoplastic resin as the insulating binder and heated to render the composition plastic. In this form, the composition may be applied to the base material without the necessity for a solvent. Yet again, a solvent solution of the coating composition may be emulsified or dispersed in water and the aqueous emulsion or dispersion coated on the base material.

The function of the base or backing material used in preparing the binder plates is to provide physical support for the photoconductive insulating layer and to act as a ground thereby permitting the photoconductive insulating layer to receive an electrostatic charge in the dark and permitting the charges to migrate when exposed to light. It is evident that a wide variety of materials may be used, for example, metal surfaces such as aluminum, brass, stainless steel, copper, nickel, zinc, etc.; conductively coated glass as tin- or indium-oxide coated glass, aluminum coated glass, etc.; similar coatings on plastic substrates as on polyethylene terephthalate, cellulose acetate, polystyrene, etc. or paper rendered conductive as by the inclusion of a suitable chemical therein or through condi-

tioning in a humid atmosphere to insure the presence therein of sufficient water content to render the material conductive. To act as a ground plane as described herein, the backing material may have a surprisingly high resistivity such as 10^6 or 10^8 ohm-cm.

Where the composite layer of binder and photoactive compound has sufficient strength to form a self-supporting layer (termed "pellicle"), it is possible to eliminate a physical base or support member and substitute therefor any of the various arrangements well known to the art in place of the ground plane previously supplied by the base layer. A ground plane, in effect, provides a source of mobile charges of both polarities. The deposition on the other side of the photoconductive insulating layer (from the ground plane) of sensitizing charges of the desired polarity causes those charges in the ground plane of opposite polarity to migrate to the interface at the photoconductive insulating layer. Without this the capacity of the insulating layer by itself would be such that it could not accept enough charge to sensitize the layer to a xerographically useful potential. It is the electrostatic field between the deposited charges on one side of the photoconductive layer and the induced charges (from the ground plane) on the other side that stresses the layer so that when an electron is excited to the conduction band by a photon thereby creating a hole-electron pair, the charges migrate under the influence of this field thereby creating the latent electrostatic image. It is thus obvious that if the physical ground plane is omitted a substitute therefor may be provided by depositing on opposite sides of the photoconductive insulating pellicle simultaneously electrostatic charges of opposite polarity. Thus, if positive electrostatic charges are placed on one side of the pellicle as by corona charging as described in U.S. 2,777,957 to L. E. Walkup, the simultaneous deposition of negative charges on the other side of the pellicle also by corona charging will create an induced, that is, a virtual, ground plane within the body of the pellicle just as if the charges of opposite polarity had been supplied to the interface by being induced from an actual ground plane. Such an artificial ground plane permits the acceptance of a usable sensitizing charge and at the same time permits migration of the charges under the applied field when exposed to activating radiation. Where the composite layer of binder pigment does not form a self-supporting layer but rather is coated on a truly insulating backing as polyethylene terephthalate, the use of artificial ground planes as described herein, makes possible the use of the xerographic member in the xerographic process. In addition to inducing a ground plane as described herein, a ground plane may also be supplied by positioning the pellicle or insulating backing on a removable conductive backing during the critical charging step. As used hereafter in the specification and claims, the term "conductive base" includes both a physical base and an "artificial" one as described herein.

The binder material which is employed in cooperation with the tetragonal lead monoxide mixture is a material which is an insulator to the extent that an electrostatic charge placed on the layer is not conducted by the binder at a rate to prevent the formation and retention of an electrostatic latent image or charge thereon. The binder material is adhered tightly to the base material and provides an efficient dispersing medium for the pigment particles. Further, the binder should not react chemically with the pigment. Lead compounds are particularly apt to react with silicone resins so that such resins should be used with care in formulating suitable binders. Satisfactory binder materials for the practice of the invention are acrylic and methacrylic ester polymers, particularly polymerized butyl methacrylates; vinyl polymers such as polystyrene, polyvinyl chloride, polyvinyl acetate, copolymers of these materials; alkyd resins, etc. In addition, mixtures of such resins with each other or with plasticizers so as to improve adhesion, flexibility, blocking, etc. of the coatings, may be used.

The physical shape or conformation of the xerographic binder plate may be in any form whatsoever as desired by the formulator such as flat, spherical, cylindrical, etc. The plate may be flexible or rigid.

The spectral sensitivity of plates prepared in accordance with the instant invention may, as is obvious to those skilled in the art, be modified through the inclusion of photo-sensitizing dyes therein. The dyes useful for this purpose are those commonly used in photographic sensitization. The basic mechanism of dye sensitization in xerographic binder plates is believed to be the same as in photographic sensitization. By using such dyes singly or in combination it is possible to further modify and, in effect, tailor-make the resulting binder plate.

Examples 1 through 3

A series of 3 xerographic plates were prepared by charging a ball-mill with pigment, resin and toluene and then ball-milling the mixture using porcelain balls about 0.5-inch in diameter. The resulting finely-ground mixture was whirl coated on a 4 x 5-inch aluminum plate rotating at about 120 r.p.m. In each example the charge to the ball-mill consisted of tetragonal lead monoxide C.P. grade, a polybutyl methacrylate obtained from E. I. du Pont de Nemours & Co. under the trade name Lucite 46 and sufficient toluene to give a good coating viscosity The ratios of lead monoxide to Lucite (by volume) were, in order: 0.28:1; 0.55:1, and 0.88:1. The resulting coatings were each 25 microns thick. All coating mixtures were ball-milled for 18 hours.

The spectral sensitivity of these plates in the xerographic process was then determined by first placing an electrostatic charge on the plate using corona charging as described in U.S. 2,777,957 to L. E. Walkup. The electrically charged plate was then exposed to monochromatic light using a Beckman spectrophotometer at a light intensity of 0.12 microwatt per square centimeter. All plates were kept in the dark for several hours prior to testing and different portions of the plates were used for each of the exposures to the spectrophotometer. A vibrating probe electrometer was used to record the initial electrostatic charge on the plate prior to exposure and the charge remaining after exposure. The light sensitivity in the blue, green and the red was then computed for the plates using the formula:

$$S=\frac{T_d-T_1}{I\ T_d\ T_1}$$

where

T_d is the time in seconds for the potential on the plate to decay in the dark to one-half of some given value,

T_1 is the time in seconds for the potential on the plate to decay under given illumination to one-half of the same initial value used in the determination of T_d, and

I is the intensity of the light in microwatts per square centimeter.

The resulting values are plotted in FIG. 1 for both positive and negative electrostatic sensitization.

Examples 4 through 8

Examples 1 through 3 were duplicated excepting that in each case the ball-milling time was increased from 18 hours to 65 hours. The ratios of lead monoxide to Lucite (by volume) were, in order: 0.28:1; 0.55:1; 0.88:1; 1:1; and 1.5:1. The resulting coatings were, respectively, 35, 35, 25, 25, and 25 microns thick. The spectral sensitivity of the plates were determined as in Examples 1 through 3 and are shown in FIG. 2.

Example 9

A xerographic plate was prepared as in Examples 1 through 3. The charge to the ball-mill consisted of 0.54 part by volume of zinc oxide obtained from the New Jer-

sey Zinc Co. under the trade name Florence Green Seal No. 8 and 1 part by volume of a silicone resin obtained from the General Electric Company under the trade name SR–82 and sufficient toluene to give good grinding viscosity. The resulting coating was 23 microns thick. For comparison purposes a commercial xerographic plate was obtained from The Haloid Company, Rochester, New York under the trademark XeroX plate. This XeroX plate comprised a layer of vitreous selenium on an aluminum backing. The zinc oxide binder plate and the XeroX plate were then tested for light sensitivity as described in Examples 1 through 3. The relative white light sensitivity of the zinc oxide plate, the XeroX plate and the plate of Example 7 were then calculated for photoflood light by numerical integration of the emission curve of the light source and the spectral sensitivity curve of the photoactive material. The curve for the photoflood light source used is shown in FIG. 3. The results of these calculations are shown in bar-graph form in FIG. 4 with the sensitivity rating normalized to 100 for the most sensitive plate.

Examples 10 through 15

A series of 6 xerographic plates were prepared as in Examples 1 through 3. In each case the total pigment to binder ratio by volume was approximately 0.8:1. The binder in each case was Lucite 46 and the solvent used in obtaining good grinding viscosity was toluene. All parts are by volume. In Example 10 the pigment consisted of C.P. grade tetragonal lead monoxide and in Example 15 was zinc oxide (Florence Green Seal No. 8). In Example 11 the pigment consisted of 4 parts of lead monoxide to 1 part of zinc oxide; in Example 12, 3 parts of lead monoxide to 1 part of zinc oxide; in Example 13, 2 parts of lead monoxide to 1 part of zinc oxide; and in Example 14, 1 part of lead monoxide to 1 part of zinc oxide. The thicknesses of the different coatings were, respectively, 25, 35, 33, 33, 38 and 25 microns.

The light sensitivity of the plates were then determined as described in Examples 1 through 3, and the results shown in FIG. 5. As can be seen from the sensitivity curves, the effect of the zinc oxide is to lower the over-all sensitivity of the lead monoxide. By reason of the inherent photoconductivity of the zinc oxide in the near ultraviolet, the combination of zinc oxide and lead monoxide particularly offers opportunity for dye sensitization to improve over-all spectral sensitivity.

Examples 16 and 17

An aqueous solution of lead acetate was boiled with sodium hydroxide and finely-divided red tetragonal lead monoxide precipitated out from the boiling solution. The resulting reaction product was filtered and the lead monoxide used to prepare two binder plates. The binder plates were prepared as in Examples 1 through 3 using 2 parts by volume of lead monoxide to 1 part of Lucite 46 and sufficient toluene to give good grinding viscosity. In the one plate the mixture was ball-milled for 4 hours whereas in the second plate the mixture was ball-milled 8 hours. The resulting coatings were each 25 microns thick. The light sensitivity of the xerographic plates were then tested as described in Examples 1 through 3. The peak sensitivity of the plate of Example 16 was 7.8 (occurring at a wavelength of 550 millimicrons) and of the plate of Example 17, 8.3 (occurring at a wavelength of 550 millimicrons). The red tetragonal lead monoxide obtained by this process is already in a relatively fine particle size and, hence, necessitates less milling time for reduction to the desired particle size range.

Examples 18 through 21

A lot of yellow orthorhombic lead monoxide C.P. grade was converted to the red tetragonal state by the following treatment: About 50 parts by weight of the orthorhombic lead monoxide were boiled for one hour in 148 parts by weight of a 12 molal aqueous solution of sodium hydroxide. The resulting dark red tetragonal crystals were separated by repeated decantation and washing with distilled water followed by washing with absolute methanol. A xerographic plate was prepared from this red lead monoxide as described in Examples 1 through 3. The plate so prepared contained 0.88 part by volume of the lead monoxide to 1 part by volume of Lucite 46. Toluene was used as the solvent to obtain suitable grinding viscosity. The plate so prepared was 20 microns thick. Ball-milling time was 4 hours. For Example 19 the xerographic plate was prepared as in Example 18 by using the unconverted yellow lead monoxide. For Example 20 a xerographic plate was made exactly as in Example 18 using a C.P. grade of red tetragonal lead monoxide as the pigment. In Example 21 a sample of the tetragonal lead monoxide of Example 20 was heated to 1200 F. for several hours. Upon cooling to room temperature the lead monoxide was found to have an orange yellow color rather than the reddish color of the tetragonal lead monoxide or the bright pure yellow of the orthorhombic lead monoxide indicating that the sample consisted primarily of orthorhombic lead monoxide with a minor amount of tetragonal lead monoxide. This impure orthorhombic lead monoxide was then used to prepare a binder plate exactly as in Example 18. The light sensitivity of binder plates was then determined as described in Examples 1 through 3 for a wavelength of 550 millimicrons to obtain an indication of relative sensitivity. The plate of Example 19 (C.P. grade orthorhombic lead monoxide) showed no light sensitivity. The plate of Example 21 (C.P. grade tetragonal lead monoxide largely but not completely converted to orthorhombic lead monoxide) had a light sensitivity of 0.76. The plate of Example 18 (C.P. grade yellow orthorhombic lead monoxide completely converted to red tetragonal lead monoxide) had a sensitivity of 4.6. The plate of Example 20 (C.P. grade red tetragonal lead monoxide) had a sensitivity of 6.0. These examples show clearly that the light sensitivity of lead monoxide is peculiar to the tetragonal modification.

The thickness of the photoconductive insulating layer is not critical. In general, the layer may be anywhere from about 10 to 200 microns thick. For best operation it is preferred that the layer not be over about 100 microns thick. As can be seen from a comparison of Examples 1 through 3 with 4 through 6, prolonged ball-milling tends to decrease photosensitivity and increase plate surface quality as well as reducing the dark decay rate of plate potential for positive charging. Where fine particle size is obtained without resorting to physical abrasion of pigment particles as through chemical treatment as in Examples 16 and 17, the increased plate surface quality and reduced dark decay attendant on reduced particle size may be achieved without loss of light sensitivity as would be the case if the reduction in particle size were achieved only through physical abrasion.

As is usual in xerography, the xerographic properties of the plates of the instant invention vary somewhat with the ambient relative humidity. In general, the instant plates show no appreciable variation in their xerographic properties in the relative humidity range up to about 60%. Relative humidities greater than this, in general, increase light and dark decay of potential. The plates have been found to be operable in the xerographic process at relative humidities of over 90%.

As can be seen from Examples 1 through 8 the ratio of pigment to binder may vary greatly without affecting the operability of the plates of the xerographic process. In general, the range of from about 1 part pigment to 5 parts binder to about 2 parts pigment to 1 of binder by volume has been found to be useful. The actual proportions will, of course, depend on the specific binder as well as on the properties and characteristics desired. As a general guide it is indicated that the constituents of

the binder should be the least amount which will adequately secure the photoconductor to the surface of the backing member and which will form a smooth and useful surface for the ultimate deposition thereon of electrostatically charged powder particles.

Tetragonal lead monoxide is, of course, colored. When the powder image is permanently affixed to the surface of the binder plate there results a black or colored powder image on a background ranging from tan to dark red in color. While such an image is quite legible for some applications, it is desirable that the background be white. In the case of the novel xerographic plates of the instant invention, this may be easily achieved by merely contacting the surface of the binder plate, having the powder image permanently affixed thereto, with a suitable acid which reacts with the lead monoxide to form a white or colorless salt. As an example, flowing dilute acetic acid across the surface of the binder plate converts the lead monoxide to white lead acetate. At the same time the powder image fused to the binder plate surface is not attacked by the acetic acid. Thus, there is obtained a black or colored image on a white or near white background.

The xerographic member of the instant invention may be used as the light-sensitive member in any of the regular xerographic processes. The method of electrically charging the xerographic member is not at all critical. In addition to corona charging already described, any other sensitizing technique known to those skilled in the art may be used. Thus, a potential may be applied between the xerographic member and a radioactive source supplying ions whereby the ions are drawn to the xerographic plate; the plate may be charged by electrostatic induction as described in U.S. 2,297,691 to C. F. Carlson; charging may be by contact with a conductive rubber roller bearing a potential of several hundred volts while being rolled in contact with the plate and so on.

The electrostatic image formed on the plate of the instant invention may be made visible by any of the means known to those skilled in the art, as carrier cascade development described in U.S. 2,638,416 to Walkup and Wise; the use of a magnet to control the movement of the carrier-toner mixture (called magnetic brush development) as described in U.S. 2,791,949 to Simmons and Saul; fur brush development; powder cloud development as described in U.S. 2,784,109 to L. E. Walkup, etc. The electrostatically charged marking particles may have either the same polarity of electrostatic charge as the image areas on the xerographic member (in which case they are deposited on the background to yield a reversible or negative print) or they may have the opposite polarity of electrostatic charge to that of the image areas (whereby they deposit on the charged areas of the xerographic member to yield a positive reproduction). These and other modifications and variations will be apparent to those skilled in the art.

While the present invention has been described herein as carried out in specific embodiments thereof, it is not desired to be limited thereby but it is intended to cover the invention broadly within the spirit and scope of the appended claims.

What is claimed is:

1. A xerographic member comprising a conductive backing and a photoconductive insulating layer thereon from about 10 to 200 microns thick, said layer comprising a resinous polyacrylic acid ester binder and dispersed therein finely-divided particles of tetragonal lead monoxide as the sole lead compound in the ratio of from about 1 part lead monoxide to 2 parts binder to about 2 parts lead monoxide to 1 part binder by volume said binder being chemically inert to said lead monoxide.

2. A xerographic member according to claim 1 wherein the binder is a resinous polybutyl methacrylate.

3. A process for producing an electrostatic image corresponding to a pattern of light and shadow said process comprising in the absence of activating radiation placing sensitizing electrostatic charges of one polarity on the photoconductive insulating surface of a xerographic member comprising a conductive backing and a thin photoconductive insulating layer thereon of an insulating resin binder and dispersed therein finely-divided particles of tetragonal lead monoxide as the sole lead compound thereby creating an electrostatic field across said layer, and exposing the electrically charged surface to a pattern of light and shadow to be recorded whereby electrostatic charges migrate through said layer in the areas irradiated by light so that an electrostatic image is formed corresponding to said pattern.

4. A process for recording a pattern of light and shadow comprising in the absence of activating radiation placing sensitizing electrostatic charges of one polarity on the photoconductive insulating surface of a xerographic member comprising a conductive backing and a thin photoconductive insulating layer thereon comprising an insulating resin binder and dispersed therein finely-divided particles of tetragonal lead monoxide as the sole lead compound, exposing the thus charged surface to a pattern of light and shadow to be recorded whereby an electrostatic image is formed corresponding to said pattern and depositing electrically attractable finely-divided marking material selectively in conformity with the electrostatic image thus produced.

5. A process for recording a pattern of light and shadow comprising in the absence of activating radiation placing sensitizing electrostatic charges of one polarity on the photoconductive insulating surface of a xerographic member comprising a conductive backing and a thin photoconductive insulating layer thereon comprising an insulating resin binder and dispersed therein finely-divided particles of tetragonal lead monoxide as the sole lead compound, exposing the thus charged surface to a pattern of light and shadow to be recorded whereby an electrostatic image is formed corresponding to said pattern and contacting the surface bearing said electrostatic image with finely-divided marking material electrostatically charged to the same polarity as the electrostatic charges of said electrostatic image.

6. A process for recording a pattern of light and shadow comprising in the absence of activating radiation placing sensitizing electrostatic charges of one polarity on the photoconductive insulating surface of a xerographic member comprising a conductive backing and a thin photoconductive insulating layer thereon comprising an insulating resin binder and dispersed therein finely-divided particles of tetragonal lead monoxide as the sole lead compound, exposing the thus charged surface to a pattern of light and shadow to be recorded whereby an electrostatic image is formed corresponding to said pattern and contacting the surface bearing said electrostatic image with finely-divided marking material electrostatically charged to the opposite polarity as the electrostatic charges of said electrostatic image.

7. A xerographic member comprising a conductive backing having a photoconductive insulating layer thereon about 10 to 200 microns thick, said layer comprising an insulating resin binder and dispersed therein finely divided pigment particles in the ratio of from about 1 part total pigment to 5 parts binder to about 2 parts total pigment of 1 part binder by volume, said pigment consisting of zinc oxide and tetragonal lead monoxide, at least half of said pigment by volume being lead monoxide, said binder being chemically inert to said lead monoxide.

8. A xerographic member according to claim 7 wherein said total pigment consists of about 1 part zinc oxide to about 1 part tetragonal lead monoxide by volume.

9. A xerographic process comprising imposing an electrostatic field through a photoconductive insulating layer comprising an insulating resin binder and dispersed therein finely divided particles of tetragonal lead monoxide as

the sole lead compound, said layer being positioned in electrical contact with a non-light-sensitive electrically conductive backing and while the field is imposed selectively flowing charge through portions of the photoconductive insulating layer by selectively exposing said portions to activating radiation forming a varying charge pattern of intelligence to be reproduced which is adapted to be developed with marking material.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,008,825 November 14, 1961

Warren G. Van Dorn et al.

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 1, line 51, for "second" read -- Second --;
column 8, line 65, for "of", first occurrence, read -- to --.

Signed and sealed this 17th day of July 1962.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

DAVID L. LADD
Commissioner of Patents