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Señor

Jefe de la División de Nuevas Creaciones

Superintendencia de Industria y Comercio

Ministerio de Comercio, Desarrollo, Industria y Turismo

E. S. D.

Re.: Expediente No. **05 048.988**
Solicitud del examen de patentabilidad correspondiente a la Patente PCT Entrada en Fase Nacional, para:
"PELICULA LAMINADA DE BARRERA DE GAS"
Solicitante: **TOPPAN PRINTING CO. LTD.**

SOLICITUD EXAMEN DE PATENTABILIDAD

(CAPITULO I)

Yo, **MARGARITA CASTELLANOS ABONDANO**, mayor de edad, identificada y domiciliada como aparece al pié de mi firma, obrando en mi calidad de apoderada de la sociedad solicitante, atentamente me permito solicitar a Ud. que se realice el examen de patentabilidad de la invención arriba citada, para lo cual anexo el comprobante de pago **No. 07-** 62.348 de **Agosto** 2 **de 2007,** correspondiente a la tasa establecida para dicha solicitud.

En consecuencia, atentamente solicito a Ud. se anexe este memorial junto con el comprobante de pago al expediente correspondiente a esta solicitud de Patente PCT Entrada en Fase Nacional, y se continúe con su tramitación.

Señor Jefe,

Margarita Castellanos Abondano
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Bogotá,
MCA/gcb/P1196 (4990-FNPCT)

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SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

NIT : 800176089-2

RECIBO OFICIAL DE CAJA : 07 - 62,348
FECHA : AGOSTO 2 DE 2007

***** C O N S I G N A C I O N *****

DEPOSITANTE	TIPO PAGO	BANCO	CUENTA	No. PAGO	FECHA PGO	Vr. PAGO
ALVARO CASTELLANOS	CONSIGNACION	BANCO POPULAR	050-00110-6	66413435	02/08/2007	2,736,000.00

***** C O N C E P T O *****

CANT.	RENTISTICO	CONCEPTO	TOTAL CONCEPTO
1	50005-01-01 SOLICITUDES	85 EXAMEN DE PATENTABILIDAD DE INVEN	404,000.00
		TOTAL : $	404,000.00

SON: CUATROCIENTOS CUATRO MIL PESOS

RESPONSABLE : _____

RECIBO DE CAJA APLICADO AL EXPEDIENTE No._____

118

Industria y Comercio
SUPERINTENDENCIA

DIVISION DE NUEVAS CREACIONES

RADICACIÓN EXPEDIENTE No 05-48988

EL EXTRACTO DE LA PRESENTE SOLICITUD DE **PATENTE DE INVENCION** FUE PUBLICADO EN LA GACETA DE PROPIEDAD INDUSTRIAL No **576** DE FECHA **31** DE **MAYO DE 2007** EL TERMINO HABIL SEÑALADO POR LA LEY EXPIRA EL **31** DE **AGOSTO** DEL **2007**

NOTA: Dentro del plazo de los seis (6) meses siguientes a partir de la fecha de publicación en la gaceta de Propiedad Industrial, deberá solicitar y cancelar el examen de patentabilidad so pena de que la solicitud caiga en abandono, de acuerdo con lo establecido en el Artículo 44 de la Decisión 486/2000.

SE PRESENTARON OPOSICIONES POR PARTE DE TERCEROS.

SI _____ NO__ _ **X** _ _____

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number : **0 646 611 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number : **94307120.9**

(51) Int. Cl.[6] : **C08G 18/38,** C08J 7/06

(22) Date of filing : **29.09.94**

(30) Priority : **30.09.93 JP 245443/93**
31.03.94 JP 64187/94

(43) Date of publication of application :
05.04.95 Bulletin 95/14

(84) Designated Contracting States :
DE FR GB IT

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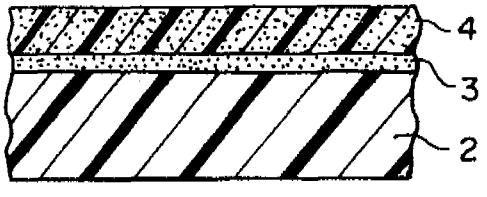
(54) Gas barrier laminated material.

(57) A gas barrier laminated material comprising a substrate, and an inorganic compound thin-film layer and a protective layer which are laminated in this order, wherein the protective layer is a layer formed by coating on the inorganic compound thin-film layer a coating composition containing a metal alkoxide or a hydrolyzate thereof and an isocyanate compound having two or more isocyanate groups, followed by heat drying, or a layer formed by coating on the inorganic compound thin-film layer a water-based coating composition containing a water-soluble polymer and at least one of (a) a metal alkoxide or a hydrolyzate thereof and (b) a tin chloride, followed by heat drying.

FIG.1



EP 0 646 611 A1

5. The gas barrier laminated material according to any one of claims 1 to 4, wherein said coating composition further contains a melamine compound or a melamine resin.

6. A gas barrier laminated material comprising a substrate, and an inorganic compound thin-film layer and a protective layer which are laminated in this order, wherein said protective layer is formed by coating on said inorganic compound thin-film layer a water-based coating composition containing a water-soluble polymer and at least one of (a) a metal alkoxide or a hydrolyzate thereof and (b) a tin chloride, followed by heat drying.

7. The gas barrier laminated material according to claim 6, wherein said tin chloride is stannous chloride, stannic chloride, or a mixture of these.

8. The gas barrier laminated material according to claim 6 or claim 7, wherein said water-soluble polymer is polyvinyl alcohol, polyvinyl pyrrolidone, starch, methyl cellulose, carboxymethyl cellulose or sodium alginate.

9. The gas barrier laminated material according to claim 8, wherein said water-soluble polymer is polyvinyl alcohol.

10. The gas barrier laminated material according to any one of claims 6 to 9, wherein said water-based coating composition contains the metal alkoxide or a hydrolyzate thereof and/or the tin chloride in an amount of from 10 parts by weight to 1,900 parts by weight in total, based on 100 parts by weight of solid content of the water-soluble polymer.

11. The gas barrier laminated material according to any preceding claim, wherein said metal alkoxide is represented by Formula (1):

$$M(OR)_n \qquad (1)$$

wherein M represents a metal atom, n represents a valence of M, and R's that number n each independently represent a lower alkyl group.

12. The gas barrier laminated material according to claim 11, wherein said M in Formula (1) is Si, Al or Zr.

13. The gas barrier laminated material according to claim 11, wherein said metal alkoxide is tetraethoxysilane, triisopropoxyaluminum or tetrabutoxyzirconium.

14. The gas barrier laminated material according to any preceding claim, wherein said protective layer has a thickness of from 0.01 μm to 50 μm.

15. The gas barrier laminated material according to any preceding claim, wherein said inorganic compound thin-film layer is formed of an oxide, nitride or fluoride of silicon, aluminum, titanium, zirconium or tin, or a composite of any of these.

16. The gas barrier laminated material according to claim 15, wherein said inorganic compound thin-film layer is an aluminum oxide deposited layer.

17. The gas barrier laminated material according to any preceding claim, wherein said inorganic compound thin-film layer has a thickness of from 5 nanometers to 300 nanometers.

US 20010031811A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2001/0031811 A1**

Li et al. (43) **Pub. Date: Oct. 18, 2001**

(54) **DURABLE COATING COMPOSITION, PROCESS FOR PRODUCING DURABLE, ANTIREFLECTIVE COATINGS, AND COATED ARTICLES**

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(21) Appl. No.: **09/795,619**

(22) Filed: **Feb. 28, 2001**

Related U.S. Application Data

(60) Division of application No. 08/585,617, filed on Jan. 16, 1996, which is a continuation-in-part of application No. 08/165,996, filed on Dec. 13, 1993, now abandoned.

Publication Classification

(51) **Int. Cl.**[7] **C08K 5/24**

(52) **U.S. Cl.** **524/262**; 524/379; 524/459; 524/535; 524/803

(57) **ABSTRACT**

Describes durable coating compositions and a process for the preparation of durable, broad-band antireflective coatings on organic polymeric host materials and photochromic organic polymeric host materials. The coating compositions consist essentially of a silane monomer mixture comprising glycidoxyalkylalkoxysilane and alkylalkoxysilane(s) with or without tetraalkoxysilanes; water-soluble organic polymer; a leveling amount of nonionic surfactant; a solvating amount of lower aliphatic alcohol; a catalytic amount of water-soluble acid; and water. The coating compositions may optionally contain fluorinated silane(s). Also describes a process for preparing antireflective coatings comprising the steps of coating a polymeric host material with the durable coating composition; curing the coating; treating the cured coating with an aqueous acidic solution to produce a graded refractive index; removing residual acid; and further curing the coating.

DURABLE COATING COMPOSITION, PROCESS FOR PRODUCING DURABLE, ANTIREFLECTIVE COATINGS, AND COATED ARTICLES

CROSS REFERENCE TO RELATED APPLICATION

[0001] This application is a continuation-in-part application of U.S. patent application Ser. No. 08/165,996 filed Dec. 13, 1993.

DESCRIPTION OF THE INVENTION

[0002] The present invention relates to novel durable coating compositions. More particularly, the present invention relates to a novel process that utilizes a durable coating to form a single-layer, durable, broad band antireflective coating on an organic polymeric host material. Still more particularly, this invention relates to articles such as optical elements, e.g., ophthalmic lenses, transparent sheets, films and photochromic articles, such as photochromic optical elements, transparent sheets and films, having on at least one surface thereof, a durable optically transparent coating of the present invention, or a durable, antireflective optically transparent coating formed by the process of the present invention.

[0003] Organic polymeric host material(s) that are typically used to make optical elements, transparent sheets and films, have surfaces that are susceptible to abrasion and chemical attack. Often, such materials are coated with a protective coating to improve their abrasion resistance.

[0004] Abrasion resistant coatings that incorporate polyvinyl alcohol or hydrolyzed polyvinyl acetate and acid polysilicic acid ester, hydrolyzed polysilicic acid ester or hydrolyzed metal lower alkoxide have been described in U.S. Pat. Nos. 2,404,426; 3,652,379; 3,971,872; 3,998,991; 4,120,992; 4,123,131; and 5,037,871. Abrasion resistant coatings incorporating hydrolyzed polysilicic acid esters and polyvinyl acetals having a hydroxyl group content of 35 to 50 weight percent, calculated as polyvinyl alcohol, are described in U.S. Pat. Nos. 4,164,602 and 4,172,187. The use of polyvinyl pyrolidone with organoalkoxysilane to form siloxane organic hybrid polymers is described in U.S. Pat. No. 5,115,023. Other protective coatings formed from a partial condensate of a silanol or an organic silicone compound (or its hydrolysate) and particulate matter such as colloidal silica or micron-sized diamonds are described in U.S. Pat. No. 3,986,997 and Japanese Patent Application 3-21678, respectively.

[0005] In U.S. Pat. No. 4,127,697, an improvement in the adhesion of the abrasion resistant coating described in U.S. Pat. No. 3,986,997 to a lens, is obtained by treating the lens with a tie-coat comprising an A-alkylenealkoxysilane, wherein A contains a group reactive with the substrate. Japanese Patent Application 62-212490 describes a coating comprising composites made of methyltrimethoxysilane and other organic silicones. This coating is used to control the rate of discoloration of organic photochromic viologen compounds that have been incorporated into a soluble resin, such as polyvinyl alcohol.

[0006] Photochromism is a reversible phenomenon exhibited by a compound which, when exposed to light radiation involving ultraviolet rays, such as the ultraviolet radiation in sunlight or in the light of a mercury lamp, changes color and then returns to its original color after the ultraviolet radiation is discontinued or the compound is stored in the dark. Various classes of photochromic compounds have been synthesized and suggested for use in applications in which a sunlight-induced reversible color, change or darkening is desired. For example, spiro(indoline)pyridobenzoxazine photochromic compounds are described in U.S. Pat. No. 4,637,698. Spiro(indoline)naphthoxazines are described in U.S. Pat. Nos. 3,562,172; 3,578,602; 4,215,010 and 4,342,668. Benzopyrans and naphthopyrans having a nitrogen-containing substituent at the 2-position of the pyran ring are described in U.S. Pat. No. 4,818,096. All of the afore-described oxazine- and pyran-type organic photochromic compounds are reported to exhibit a color change of from colorless to purple/blue on exposure to a source of ultraviolet (UV) light, e.g., sunlight.

[0007] Other organic photochromic compounds are reported to exhibit a color change of from colorless to yellow/orange when exposed to a source of UV light. Examples of such organic photochromic compounds are benzopyrans and naphthopyrans having a spiro adamantane group at the 2-position of the pyran ring. These spiropyrans are described in U.S. Pat. No. 5,826,977. Other yellow/orange coloring organic photochromic compounds include the naphthopyran compounds described in U.S. Pat. No. 5,066,818. These compounds contain at least one ortho-substituted phenyl substituent at the 3-position of the pyran ring, preferably a monoortho-substituted phenyl substituent.

[0008] As reported in the literature, a major market demand for photochromic ophthalmic lenses are for those that darken to a brown or gray color. See, for example, U.S. Pat. No. 4,818,096 (column 2, lines 35-45). In order to achieve such a near neutral coloring of an article, blending of one organic photochromic substance having an absorption maximum within the range of between greater than 590 and about 700 nanometers and another organic photochromic substance exhibiting at least one absorption maximum and preferably two absorption maxima, within the range of between about 400 and less than 500 nanometers has been described in U.S. Pat. No. 4,968,454.

[0009] Antireflective coatings on ophthalmic lenses have become very desirable for consumers in various world markets. The advantages of such coatings, as reported by K. H. Guenther in Thin Film Coating Technology for Ophthalmic Lenses, SPIE, 601, Ophthalmic Optics, 1985, pages 76-87, are the elimination of ghost images due to multiple internal reflections and of disturbing reflection to the wearer and the external viewer. As a consequence, the aesthetic-cosmetic benefit to the wearer is that he or she not only sees better, but also looks better.

[0010] The use of a single layer to form antireflective coatings to reduce reflection losses and increase the transmission of optical glass and plastic systems is described in U.S. Pat. Nos. 5,116,644 and 5,198,267, and European Patent 0402473. The use of a two- or three-layered coating to produce antireflective surfaces has been described in U.S. Pat. Nos. 5,104,692 and 5,173,368. In most cases, an antireflective surface is prepared on an optical article by first coating the article with a hard coat and then applying the antireflective layer, as described in U.S. Pat. No. 4,904,525 and Japanese Patent Application 60-88901. U.S. Pat. No. 5,116,664 describes an antireflective layer formed by coating a lens with a siloxane-containing hard coat solution having at least one oxide sol, hardening the coated solution to give a hard coat layer, and immersing the lens into an acidic or alkaline solution to dissolve the oxide particles contained in the hard coat layer so as to make the layer non-uniform.

or 1, e is the integer 1 or 2, and f is the integer 2 or 3, provided that the sum of d, e, and f is not greater than 4. The weight ratio in the silane monomer mixture of the first silane monomer to the second silane monomer may vary from about 1:3 to 1:20, preferably from about 1:4 to 1:15, and more preferably from about 1:7 to 1:10.

[0021] The other coating composition of the present invention is identical to the aforementioned coating composition except that it is substantially free of tetraalkoxysilane and the weight ratio of the first silane monomer to the second silane monomer is from 1:7 to 1:15, and preferably from 1:7 to 1:10.

[0022] Suitable silane monomers that may be used as the first silane monomer include glycidoxymethyltriethoxysilane, alpha-glycidoxyethyltrimethoxysilane, alpha-glycidoxyethyl-triethoxysilane, beta-glycidoxyethyltrimethoxysilane, beta-glycidoxyethyltriethoxysilane, alpha-glycidoxy-propyltrimethoxysilane, alpha-glycidoxypropyltriethoxysilane, beta-glycidoxypropyltrimethoxysilane, beta-glycidoxypropyltriethoxysilane, gamma-glycidoxypropyltrimethoxysilane, gamma-glycidoxypropylmethyldimethoxysilane, gamma-glycidoxy-propyldimethylethoxysilane, hydrolysates thereof, and mixtures of such silane monomers. Preferably, the first silane monomer is selected from the group consisting of gamma-glycidoxy-propyltrimethoxysilane, gamma-glycidoxypropylmethyldimethoxy-silane, and gamma-glycidoxypropyldimethylethoxysilane, and more preferably is gamma-glycidoxypropyltrimethoxysilane.

[0023] Suitable silane monomers that may be used as the second silane monomer include methyltrimethoxysilane, methyl-triethoxysilane, methyltri-acetoxysilane, methyltripropoxysilane, methyltributoxysilane, ethyltrimethoxysilane, ethyltriethoxysilane, gamma-meth-acryloxypropyltrimethoxysilane, gamma-aminopropyltri-methoxysilane, gamma-aminopropyltriethoxysilane, gamma-mer-captopropyltrimethoxysilane, chloromethyltrimethoxysilane, chloromethyltriethoxysilane, dimethyldiethoxysilane, gamma-chloropropylmethyldimethoxysilane, gamma-chloropropylmethyldiethoxysilane, hydrolysates thereof, and mixtures of such silane monomers. Preferably, the second silane monomer is selected from the group consisting of methyltrimethoxy-silane, methyltriethoxysilane, ethyltrimethoxysilane, and ethyltriethoxysilane, and more preferably it is methyltri-methoxysilane.

[0024] Tetra(C_1-C_4)alkoxysilanes, when present in the coating composition, are present at a level of from about 1 to 40 weight percent, preferably 2 to 20 weight percent and more preferably, from 2 to 10 weight percent. Suitable compounds include tetramethoxysilane, tetraethoxysilane, tetra-n-propoxysilane, tetra-n-butoxysilane, hydrolysates thereof, and mixtures of such silane monomers. Preferably, tetraethoxysilane is used.

[0025] The coating composition containing tetraalkoxysilane and having the preferred weight ratio of the first to the second silane monomer of from 1:4 to 1:15, as well as the tetraalkoxysilane-free coating composition of the present invention, may also contain from about 1 to about 10, preferably 1 to 5, weight percent of fluorinated silane. The fluorinated silane may be selected from the group consisting of trifluoroacetoxypropyl tri(C_1-C_2)alkoxysilanes; 3-(heptafluoroisopropoxy)propyltrichlorosilane; 3-(heptafluoroisopropoxy)propyltriethoxysilane; N-(3-triethoxysilylpropyl)perfluorooctanoamide; N-(3-triethoxysilylpropyl)perfluoro(2,5-dimethyl-3,6-dioxanonanoyl)amide and substances corresponding to the general formula: $F(CF_2)_gCH_2CH_2Si(CH_3)_hZ_{3-h}$, wherein Z is chloro, methoxy or ethoxy, g is an integer selected from the integers 1 to 10, and h is the integer 0, 1 or 2.

[0026] The preferred fluorinated silane(s) are those substances having the general formula: $F(CF_2)_gCH_2CH_2Si(CH_3)_hZ_{3-h}$. Such substances include tridecafluoro-1,1,2,2-tetrahydrooctyl-1-dimethylchlorosilane, tridecafluoro-1,1,2,2-tetrahydrooctyl-1-methyldichlorosilane, tridecafluoro-1,1,2,2-tetrahydro-octyl-1-trichlorosilane, tridecafluoro-1,1,2,2-tetrahydro-octyl-1-triethoxysilane, 3,3,3-trifluoropropyldimethyl-chlorosilane, 3,3,3-trifluoropropylmethydichlorosilane, 3,3,3-trifluoropropylmethyldimethoxysilane, 3,3,3-tri-fluoropropylmethyldimethoxysilane, 3,3,3-trifluoro-propyltrichlorosilane, 3,3,3-trifluoropropyltrimethoxysilane, 1H, 1H, 2H, 2H-perfluoroalkyltriethoxysilane, 1H, 1H, 2H, 2H-perfluorodecyldimethylchlorosilane, 1H, 1H, 2H, 2H-perfluorodecylmethyldichlorosilane, 1H, 1H, 2H, 2H-perfluorotrichlorosilane, 1H, 1H, 2H, 2H-perfluorotriethoxysilane, 1H, 1H, 2H, 2H-perfluorooctylmethyldichlorosilane, 1H, 1H, 2H, 2H-perfluorooctyltrichlorosilane, and 1H, 1H, 2H, 2H-perfluoro-octyltriethoxysilane. The most preferred fluorinated silane is 3,3,3-trifluoropropyltrimethoxysilane.

[0027] Water-soluble organic polymer is present in the coating composition in amounts sufficient to bind and form the coating or film resulting from polycondensation of the various silane components of the coating composition, i.e., a binding amount, which typically is at a level of from about 1 to about 8 weight percent, preferably 1 to 6 weight percent. Suitable water-soluble polymers are those polymers that have a solubility in water of at least about 1 to 10 weight percent at 25° C. Additionally, the water-soluble polymers are chemically compatible with the silane monomers in the coating composition, i.e., capable of forming siloxane organic hybrid polymers, are optically clear and mechanically strong, i.e., provide sufficient mechanical strength and integrity to the porous coating.

[0028] Water-soluble polymers that may be used include natural gums such as guar gums, locust bean gums, and xanthan gums; hydroxyalkylcelluloses such as hydroxyethylcellulose and hydroxypropylcellulose, the synthesis and structure of which are described in U.S. Pat. Nos. Nos. 3,278,521 and 4,661,589, which are herein incorporated by reference; cellulosic polymers such as carboxymethyl cellulose, methyl cellulose, and ethylmethyl cellulose; polyvinyls, polyvinyl maleic anhydride copolymers, polyvinyl alcohols, copolymers of polyvinyl alcohol and polyvinyl amine having up to 30 weight percent of polyvinyl amine, polyvinylamines, and polyvinyl pyrrolidones; polyacrylates and related systems such as polyacrylic acids, polymethacrylic acids, polyacrylamides, polycarboxylates, and polyvinyl ethyl ether; polyimines and related systems such as polyethylenimine, polyethylene oxides, polyethylene glycols and mixtures of such water-soluble polymers.

[0029] The preferred water-soluble polymers are polyvinyl alcohol, hydroxyethylcellulose and polyvinyl pyrrolidone. Suitable polyvinyl alcohols range in number average molecular weight from 3,000 to 150,000 and range from 72 to greater than 99 percent hydrolyzed, preferably at least 87 percent hydrolyzed. Suitable hydroxyethylcelluose polymers range in number average molecular weight from 9,000 to 1,300,000 and range in molar substitution from 1.5 to 3.5 as described in the *Kirk-Othmer Encyclopedia of Chemical Technology*, 4th Edition, Volume 5, John Wiley and Sons,

[0046] Each of the photochromic substances described herein may be used in amounts (or in a ratio) such that an organic host material to which the photochromic compounds or mixture of compounds is applied or in which they are incorporated exhibits a desired resultant color, e.g., a substantially neutral color when activated with unfiltered sunlight, i.e., as near a neutral color as possible given the colors of the activated photochromic compounds.

[0047] A neutral gray color exhibits a spectrum that has relatively equal absorption in the visible range between 400 and 700 nanometers. A neutral brown color exhibits a spectrum in which the absorption in the 400-550 nanometer range is moderately larger than in the 550-700 nanometer range. An alternative way of describing color is in terms of its chromaticity coordinates, which describe the qualities of a color in addition to its luminance factor, i.e., its chromaticity. In the CIE system, the chromaticity coordinates are obtained by taking the ratios of the tristimulus values to their sum, e.g., $x=X/(X+Y+Z)$ and $y=Y/(x+Y+Z)$. Color as described in the CIE system can be plotted on a chromaticity diagram, usually a plot of the chromaticity coordinates x and y. See pages 47-52 of *Principles of Color Technology*, by F. W. Billmeyer, Jr., and Max Saltzman, Second Edition, John Wiley and Sons, N.Y. (1981). As used herein, a near neutral color is one in which the chromaticity coordinate values of "x" and "y" for the color are within the following ranges (D65 illuminant): x=0.260 to 0.400, y=0.280 to 0.400 following activation to 40 percent luminous transmission by exposure to solar radiation (Air Mass 1 or 2).

[0048] The amount of photochromic substance or composition containing same applied to or incorporated into a host material is not critical provided that a sufficient amount is used to produce a photochromic effect discernible to the naked eye upon activation. Generally such amount can be described as a photochromic amount. The particular amount used depends often upon the intensity of color desired upon irradiation thereof and upon the method used to incorporate or apply the photochromic substances. Typically, the more photochromic substance applied or incorporated, the greater is the color intensity up to a certain limit.

[0049] The relative amounts of the aforesaid photochromic compounds used will vary and depend in part upon the relative intensities of the color of the activated species of such compounds, and the ultimate color desired. Generally, the amount of total photochromic substance incorporated into or applied to a photochromic optical host material may range from about 0.05 to about 1.0, e.g., from 0.1 to about 0.45, milligrams per square centimeter of surface to which the photochromic substance(s) is incorporated or applied.

[0050] Photochromic substances may be applied to or incorporated into a host material such as a polymeric organic host material by various methods described in the art. Such methods include dissolving or dispersing the photochromic substance within the host material, e.g., casting it in place by adding the photochromic substance to the monomeric host material prior to polymerization; imbibition of the photochromic substance into the host material by immersion of the host material in a hot solution of the photochromic substance or by thermal transfer; providing the photochromic substance as a separate layer between adjacent layers of the host material, e.g., as a part of a polymeric film; and applying the photochromic substance as part of a coating placed on the surface of the host material. The term "imbibition" or "imbibe" is intended to mean and include permeation of the photochromic substance alone into the host material, solvent assisted transfer of the photochromic substance into a porous polymer, vapor phase transfer, and other such transfer mechanisms.

[0051] Compatible (chemically and color-wise) tints, i.e., dyes, may be applied to the host material to achieve a more aesthetic result, for medical reasons, or for reasons of fashion. The particular dye selected will vary and depend on the aforesaid need and result to be achieved. In one embodiment, the dye may be selected to complement the color resulting from the activated photochromic substances, e.g., to achieve a more neutral color or absorb a particular wavelength of incident light. In another embodiment, the dye may be selected to provide a desired hue to the host matrix when the photochromic substances is in an unactivated state.

[0052] The host material will usually be transparent, but may be translucent or even opaque. The host material need only be transparent to that portion of the electromagnetic spectrum, which activates the photochromic substance, i.e., that wavelength of ultraviolet (UV) light that produces the open form of the substance and that portion of the visible spectrum that includes the absorption maximum wavelength of the substance in its UV activated form, i.e., the open form. Preferably, the host color should not be such that it masks the color of the activated form of the photochromic substance, i.e., so the change in color is readily apparent to the observer. More preferably, the host material article is a solid transparent or optically clear material, e.g., materials suitable for optical applications, such as plano and ophthalmic lenses, windows, automotive transparencies, e.g., windshields, aircraft transparencies, plastic sheeting, polymeric films, etc.

[0053] Examples of polymeric organic host materials which may suitable for application of the durable cured coatings and the durable, antireflective cured coatings described herein include: polymers, i.e., homopolymers and copolymers, of polyol(allyl carbonate) monomers, diethylene glycol dimethacrylate monomers, diisopropenyl benzene monomers, ethoxylated bisphenol A dimethacrylate monomers, ethylene glycol bismethacrylate monomers, poly(ethylene glycol) bismethacrylate monomers, ethoxylated phenol methacrylate monomers and alkoxylated polyhydric alcohol acrylate monomers, such as ethoxylated trimethylol propane triacrylate monomers; polymers, i.e., homopolymers and copolymers, of polyfunctional, e.g., mono-, di- or multi-functional, acrylate and/or methacrylate monomers, poly(C_1-C_{12} alkyl methacrylates), such as poly(methyl methacrylate), poly(oxyalkylene dimethacrylates), poly(alkoxylated phenol methacrylates), cellulose acetate, cellulose triacetate, cellulose acetate propionate, cellulose acetate butyrate, poly(vinyl acetate), poly(vinyl alcohol), poly(vinyl chloride), poly(vinylidene chloride), polyurethanes, thermoplastic polycarbonates, polyesters, poly(ethylene terephthalate), polystyrene, poly(alpha methylstyrene), copoly(styrene-methyl methacrylate), copoly(styrene-acrylonitrile), polyvinylbutyral and polymers, i.e., homopolymers and copolymers, of diallylidene pentaerythritol, particularly copolymers with polyol (allyl carbonate) monomers, e.g., diethylene glycol bis(allyl carbonate), and acrylate monomers.

[0054] Transparent copolymers and blends of transparent polymers are also suitable as host materials. Preferably, the host material is an optically clear polymerized organic material prepared from a thermoplastic polycarbonate resin, such as the carbonate-linked resin derived from bisphenol A and phosgene, which is sold under the trademark, LEXAN;

TABLE 9-continued

Time (sec)	Ex 16	Ex 17	Ex 18	Ex 19	Ex 20	Ex 21	Ex 22	Ex 23
30	6.22	6.15	6.01	6.09	5.92	5.90	6.02	5.72
40	6.19	6.15	6.01	6.01	5.11	5.67	6.00	5.74
50	6.16	6.15	6.00	5.82	4.78	5.26	—	5.76
70	peeled off	6.15	5.96	4.73	4.31	4.94	5.99	5.75
90	—*	6.14	5.92	3.27	2.77	3.88	5.97	5.74
100	—	6.10	peeled off	3.10	2.51	3.27	5.92	—
120	—	—	—	peeled off	2.33	2.90	5.85	—
140	—	—	—	—	2.17	peeled off	peeled off	—
160	—	—	—	—	peeled off	—	—	—
PASSED	-	-	-	+	+	+	-	-

—* Indicates that a reading wasn't taken.

[0087]

TABLE 10

Time (sec)	Ex 24	Ex 25	Ex 26	Ex 27	Ex 28
0	6.27	6.17	5.93	6.07	6.14
10	6.27	6.15	5.92	6.07	6.14
20	6.25	6.07	5.93	6.07	6.15
30	6.24	6.07	5.93	6.09	6.14
40	6.20	6.12	5.92	6.02	6.14
60	5.91	6.02	5.69	5.94	6.13
80	5.76	5.94	5.23	5.83	6.11
100	5.11	5.88	4.97	5.72	6.09
120	4.93	5.74	4.63	5.43	6.03
140	peeled off	5.56	peeled off	5.01	peeled off
160	—*	5.50 peeled off	—	peeled off	—
PASSED	+	-	+	+	-

—*Indicates that a reading wasn't taken.

[0088] The results of Tables 8, 9 and 10 show that anti-reflective coatings having an optical transmission greater than about 95%, i.e., a percent reflectance of less than about 5, were prepared with the coating compositions of Examples 12, 14, 19, 20, 21, 24, 26 and 27. The final condition of the coating, e.g., peeled off or cracked, was not considered to be critical in determining if the coating PASSED since the treatment step could be repeated and stopped at a time interval after reaching a percent reflectance level of less than about 5 and before the cracking or peeling of the coating. The percent reflectance obtained with the coating compositions of Examples 12, 14, 19, 20, 21, 24, 26 and 27 may be further reduced by the inclusion of a leaching step which was not done to the coatings prepared from Examples 6-28.

[0089] While the present invention has been described with reference to specific details of certain embodiments thereof, it is not intended that such details should be regarded as limitations upon the scope of the invention except insofar as they are included in the accompanying claims.

We claim:

1. A coating composition consisting essentially of:

(a) from about 20 to about 70 weight percent of a silane monomer mixture of (i) a first silane monomer which is a glycidoxy(C_1-C_3)alkyl(C_1-C_2)$_a$ alkyl(C_1-C_2)$_b$ alkoxysilane wherein a is an integer of from 0 to 2 and b is the integer 2 or 3, provided that b is 3 only when a is 0 or 1, and (ii) a second silane monomer having the general formula $(x)_c(C_1$-$C_3)_d$alkyl(C_1-C_3)$_e$alkyl(R^1)$_f$$Si_{4-(d+e+f)}$, wherein X is selected from the group consisting of mercapto, amino, chloro and methacryloxy, R^1 is C_1-C_4 alkoxy or acetoxy, and c and d are each the integers 0 or 1, e is the integer 1 or 2, and f is the integer 2 or 3, the weight ratio of (i):(ii) being from about 1:3 to about 1:20;

(b) from about 1 to about 40 weight percent of tetra(C_1-C_4)alkoxysilane;

(c) a binding amount of silane monomer-compatible water-soluble organic polymer;

(d) a leveling amount of nonionic surfactant;

(e) a solvating amount of lower aliphatic alcohol;

(f) a catalytic amount of water-soluble acid; and

(g) water in an amount sufficient to form hydrolysates of said silane monomers and to solubilize said water-soluble polymer and acid.

2. The coating composition of claim 1 wherein the amount of the silane monomer mixture is from about 20 to about 55 weight percent, the weight ratio of (i):(ii) is from about 1:4 to about 1:15; the amount of tetra(C_1-C_4)alkoxysilane is from about 2 to about 20 weight percent; the water-soluble polymer is selected from the group consisting of hydroxyethyl cellulose, polyvinyl alcohol, and polyvinyl pyrrolidone and is present in an amount of from about 1 to about 8 weight percent; said nonionic surfactant is selected from the group consisting of alkyl phenol ethoxylates, fluoroaliphatic polymeric esters and fluorinated alkyl polyoxyethylene ethanols; and the lower aliphatic alcohol is C_1-C_3 alkanol or aliphatic alcohol of the formula $[(R^3)_iR^4]_j(C_1$-$C_3)OH$, wherein R^3 and R^4 are each C_1-C_2 alkoxy, i is the integer 0 or 1, and j is the integer 1.

3. The coating composition of claim 2 wherein the amount of the silane monomer mixture is from about 20 to about 45 weight percent, the weight ratio of (i):(ii) is from about 1:7 to about 1:10; the amount of the tetra(C_1-C_4)alkoxysilane is from about 2 to 10 weight percent; the lower aliphatic alcohol is selected from the group consisting of methanol, ethanol, 1-propanol and 1-methoxy-2-propanol; and the water-soluble acid is acetic acid or nitric acid.

4. The composition of claim 1 wherein the first silane monomer is gamma-glycidoxypropyltrimethoxysilane, gamma-glycidoxypropylmethyldimethoxysilane, gamma-glycidoxy-propyldimethylethoxysilane, hydrolysates thereof, or mixtures of such silane monomers; the second

silane monomer is methyltrimethoxysilane, methyltriethoxysilane, ethyltri-methoxysilane, ethyltriethoxysilane, hydrolysates thereof or mixtures of such silane monomers; the water-soluble polymer is a polyvinyl alcohol that is at least 72 percent hydrolyzed; the nonionic surfactant is a fluoroaliphatic polymeric ester; the lower aliphatic alcohol is methanol, ethanol or 1-propanol and the water-soluble acid is acetic acid.

5. The composition of claim 4 wherein said polyvinyl alcohol is at least 87 percent hydrolyzed.

6. The coating composition of claim 5 wherein said solvating amount of lower aliphatic alcohol represents up to about 40 weight percent of the coating composition.

7. The coating composition of claim 3 wherein the pH of said coating composition is from about 4 to about 5.

8. The coating composition of claim 2 wherein the composition also includes from about 1 to about 10 weight percent of fluorinated silane.

9. The coating composition of claim 8 wherein said fluorinated silane is present in an amount of from about 1 to about 5 weight percent.

10. The coating composition of claim 9 wherein said fluorinated silane is 3,3,3-trifluoropropyltrimethoxysilane.

11. A coating composition consisting essentially of:

(a) from about 20 to about 70 weight percent of a silane monomer mixture of (i) a first silane monomer which is a glycidoxy(C_1-C_3)alkyl(C_1-C_2)$_a$ alkyl(C_1-C_2)$_b$ alkoxysilane wherein a is an integer of from 0 to 2 and b is the integer 2 or 3, provided that b is 3 only when a is 0 or 1, and (ii) a second silane monomer having the general formula $(X)_e(C_1$-$C_3)_d$alkyl(C_1-$C_3)_e$alkyl$(R^1)_fSi_{4-(d+e+f)}$, wherein X is selected from the group consisting of mercapto, amino, chloro and methacryloxy, R^1 is C_1-C_4 alkoxy or acetoxy, and e and d are each the integers 0 or 1, e is the integer 1 or 2, and f is the integer 2 or 3, the weight ratio of (i):(ii) being from about 1:7 to about 1:15;

(b) a binding amount of silane monomer-compatible water-soluble organic polymer;

(c) a leveling amount of nonionic surfactant;

(d) a solvating amount of lower aliphatic alcohol;

(e) a catalytic amount of water-soluble acid; and

(f) water in an amount sufficient to form hydrolysates of said silane monomers and to solubilize said water-soluble polymer and acid.

12. The coating composition of claim 11 wherein the amount of the silane monomer mixture is from about 20 to to about 55 weight percent, the weight ratio of (i):(ii) is from about 1:7 to about 1:10; the water-soluble polymer is selected from the group consisting of hydroxyethyl cellulose, polyvinyl alcohol, and polyvinyl pyrrolidone and is present in an amount of from about 1 to about 8 weight percent; said nonionic surfactant is selected from the group consisting of alkyl phenol ethoxylates, fluoroaliphatic polymeric esters and fluorinated alkyl polyoxyethylene ethanols; and the lower aliphatic alcohol is C_1-C_3 alkanol or aliphatic alcohol of the formula $[(R^3)_iR^4]_j(C_1$-$C_3)OH$, wherein R^3 and R^4 are each C_1-C_2 alkoxy, i is the integer 0 or 1, and j is the integer 1.

13. The coating composition of claim 12 wherein the amount of the silane monomer mixture is from about 20 to 45 weight percent; the lower aliphatic alcohol is selected from the group consisting of methanol, ethanol, 1-propanol and 1-methoxy-2-propanol; and the water-soluble acid is acetic acid or nitric acid.

14. The coating composition of claim 11 wherein the composition also includes from about 1 to about 10 weight percent of fluorinated silane.

15. The coating composition of claim 14 wherein said fluorinated silane is present in an amount from about 1 to about 5 weight percent.

16. A process for preparing an antireflective coating on an organic polymeric host material comprising the steps of:

(a) coating said polymeric host with a transparent durable coating composition, (b) curing said coating composition;

(c) treating the cured coating with an aqueous acidic solution comprising from about 0.5 to 3 weight percent hydrofluoric acid, and from about 0 to 1.0 weight percent nitric acid for a time sufficient to produce a coating having a graded refractive index;

(d) contacting the cured coating of step (c) with an aqueous alkaline leaching solution for a time sufficient to remove residual acid from the surface of the coating; and

(e) drying and further curing the coating of step (d).

17. The process of claim 16 wherein a nonionic fluorosurfactant is present in the aqueous acidic solution; said aqueous alkaline leaching solution is an aqueous alkaline solution comprising tetra(C_1-C_4)alkylammonium hydroxide and nonionic fluorosurfactant; and the organic polymeric host material is selected from the group consisting of poly(C_1-C_{12} alkyl methacrylates), poly(oxyalkylene dimethacrylates), poly(alkoxylated phenol methacrylates), cellulose acetate, cellulose triacetate, cellulose acetate propionate, cellulose acetate butyrate, poly(vinyl acetate), poly(vinyl alcohol), poly(vinyl chloride), poly(vinylidene chloride), thermoplastic polycarbonates, polyesters, polyurethanes, poly(ethylene terephthalate), polystyrene, poly(alpha methylstyrene), copoly(styrene-methylmethacrylate), copoly(styrene-acrylonitrile), polyvinylbutyral and polymers of members of the group consisting of polyol(allyl carbonate) monomers, polyfunctional acrylate monomers, polyfunctional methacrylate monomers, diethylene glycol dimethacrylate monomers, diisopropenyl benzene monomers, ethoxylated bisphenol A dimethacrylate monomers, ethylene glycol bismethacrylate monomers, poly(ethylene glycol) bismethacrylate monomers, ethoxylated phenol methacrylate monomers, alkoxylated polyhydric alcohol acrylate monomers and diallylidene pentaerythritol monomers.

18. The process of claim 17 wherein said nonionic fluorosurfacant is fluorinated alkylpolyoxyethylene ethanol, and said organic polymeric host material is a solid transparent homopolymer or copolymer selected from the group consisting of poly(methyl methacrylate), poly(ethylene glycol bismethacrylate), poly(ethoxylated bisphenol A dimethacrylate), thermoplastic polycarbonate, poly(vinyl acetate), polyvinylbutyral, polyurethane and polymers of members of the group consisting of diethylene glycol bis(allyl carbonate) monomers, diethylene glycol dimethacrylate monomers, ethoxylated phenol methacrylate monomers, diisopropenyl benzene monomers and ethoxylated trimethylol propane triacrylate monomers.

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SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
DIVISIÓN DE NUEVAS CREACIONES

2020
Bogotá, D.C., 25 de enero de 2008

Abogado(a)
MARGARITA CASTELLANOS A.

ASUNTO	Radicación	05-48988
	Trámite	002
	Evento	001
	Actuación	430
	Oficio	1646
	Folios	012

Patente de Invención	[x]	Patente de Modelo de Utilidad		[ ]	
Vía Nacional	[ ]				
Vía PCT (fase nacional)	[x]	Cap.I	[x]	Cap. II	[ ]

No. Sol. Internacional: PCT/JP03/14935
Fecha de Presentación Internacional: noviembre 11 de 2003

Como resultado del examen de fondo, realizado con fundamento en el artículo 45 de la Decisión 486 de la Comisión de la Comunidad Andina, se le comunica:

1. Documentos estudiados

1.1.	Descripción:	Folios: 59 a 99
1.2.	Reivindicaciones:	Folios 100 a 102
1.3.	Dibujos:	Folio: 104
1.4	Prioridad:	11 de noviembre de 2002, JP 2002-339115

2. Objeto de la invención

- La Invención se titula **"PELÍCULA LAMINADA DE BARRERA DE GAS"** (folio 1)

  En la **reivindicación independiente 1** se define una película laminada de barrera de gas caracterizada porque comprende:
  Un sustrato de resina
  Una capa de deposición de vapor de barrera de gas sobre el sustrato de resina, la cual contiene principalmente un compuesto inorgánico; y
  Una capa de cubrimiento de barrera de gas formada sobre la capa de deposición de vapor de barrera de gas;
  En donde la capa de recubrimiento de gas de barrera es formada a través de recubrimiento y secado de un líquido de recubrimiento que comprende:
  uno de los materiales seleccionados de un compuesto de silicio representado por la fórmula general $Si(OR^1)_4$...(1) y los hidrolizados del mismo;

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uno de los materiales seleccionados de un compuesto de silicio representado por la fórmula general $(R^2Si(OR^3)_3)_n$...(2) y los hidrolizados del mismo (en donde R^1 y R^3son individualmente CH_3, C_2H_5 ó $C_2H_4OCH_3$; y R^2 es un grupo funcional orgánico); y
un polímero soluble en agua que tiene un grupo hidroxilo.

- El problema planteado en esta solicitud consiste en desarrollar un material de empaque transparente con propiedades de barrera de gas bajo condiciones de altas temperaturas y humedades que permita la aplicación de detectores de metales, pueda ser utilizado para ebullición y tratamientos de retorta y no comprenda sustancias perjudiciales para el ambiente.

  La solicitud en estudio presenta una película laminada que comprende un sustrato de resina, una capa de deposición de vapor de barrera de gas y una capa de cubrimiento de barrera de gas.

- El objeto de la invención se catalogó como B32B 9/00 según la Clasificación Internacional de Patentes (IPC).

3. Determinación del Estado de la Técnica

Considerando que la fecha de presentación de la primera solicitud de patente de la cual se reivindica prioridad es: 22 de noviembre de 2002, se buscaron documentos del estado de la técnica relacionados, con fecha de publicación anterior a esta.

Nº	Documento	Título	Fecha de publicación
D1	EP 0646611	"GAS BARRIER LAMINATED MATERIAL"	05 de abril de 1995
D2	US 2001/0031811	"DURABLE COATING COMPOSITION PROCESS FOR PRODUCING DURABLE, ANTIREFLECTIVE COATINGS, AND COATED ARTICLES"	18 de octubre de 2001

4. Análisis de patentabilidad (según requisito) (artículo 14 D486)

4.1 Nivel inventivo *(artículo18 D486)*

Respecto al estado de la técnica:

- En el documento EP 0646611 (llamado D1 de aquí en adelante), se divulga un material laminado de barrera de gas que comprende un sustrato; una capa delgada de deposición de vapor de barrera y una capa de recubrimiento, las cuales son laminadas en ese orden. La capa de deposición de vapor de barrera contiene un compuesto inorgánico como óxido de aluminio y la capa de cubrimiento se forma por revestimiento, calentamiento y secado sobre la capa del compuesto inorgánico, la cual comprende un polímero soluble en agua con un grupo hidroxilo y un alcóxido metálico, tal como tetraetoxisilano o sus hidrolizados (folio 119, resumen; folio 120, reivindicaciones 6, 8, 9, 11, 12, 13, 16).

- En el documento US 2001/0031811 (llamado D2 de aquí en adelante), divulga películas transparentes que comprenden un material polimérico orgánico (sustrato de resina) y una capa de recubrimiento formada por revestimiento y secado de una composición que incluye una mezcla de glicidoxialquilalkoxisilano (compuesto de silicio de fórmula $(R^2Si(OR^3)_3)_n$) o sus hidrolizados, alquilalcoxisilanos, tetraalcoxisilanos (compuesto de silicio de fórmula $Si(OR^1)_4$); un polímero soluble en agua con un grupo hidroxilo; un surfactante; alcohol alifático; ácido soluble en agua y agua (folio 121, resúmen; folio 122, parágrafos 002, 003; folio 123, parágrafos 0022, 0023, 0024, 0028, 0029; folio 124, parágrafo 0053, folio 125, reivindicaciones 1, 2, 4; folio 126, reivindicaciones 16, 17)

Respecto a la solicitud en estudio:

- De acuerdo con la reivindicación independiente 1 de la solicitud en estudio, se entiende que el principio técnico sobre el cual se fundamenta la propuesta consiste en desarrollar una película multicapa con propiedades de barrera, la cual comprende un sustrato de resina, una capa de deposición de barrera de gas constituida por un compuesto inorgánico y una capa de cubrimiento que contiene un polímero soluble en agua con un grupo hidroxilo, un compuesto de silicio de fórmula $Si(OR^1)_4$ y sus hidrolizados y un compuesto de silicio de fórmula $(R^2Si(OR^3)_3)_n$ y sus hidrolizados, en donde R^1 y R^3son individualmente CH_3, C_2H_5 ó $C_2H_4OCH_3$; y R^2 es un grupo funcional orgánico. No obstante, en D1 se divulga un material laminado de barrera de gas que comprende un sustrato, una capa de deposición de vapor de barrera de gas y una capa de recubrimiento.

  Una diferencia entre la solicitud en estudio y D1 corresponde al compuesto de silicio de fórmula $(R^2Si(OR^3)_3)_n$ o sus hidrolizados de la capa de cubrimiento. Sin embargo, D2 sugiere una capa de cubrimiento que contiene dicho compuesto de silicio y los demás componentes establecidos en la solicitud en estudio.

  Así las cosas, un técnico de nivel medio versado en la materia que tuviera acceso a D1 y D2, podría verse motivado a desarrollar materiales laminados con propiedades de barrera de gas que comprendan un sustrato de resina, una capa de deposición de vapor de barrera constituida por un compuesto inorgánico y una capa de cubrimiento cuya composición incluye un polímero soluble en agua, y compuestos de silicio o sus hidrolizados.

  Dado lo anterior, la propuesta de la solicitud no representa un avance tecnológico o un salto cualitativo sobre el estado de la técnica. Por el contrario parece un mejoramiento que cae dentro de la línea normal del avance de la tecnología que un técnico de nivel medio versado en la materia podría llevar a cabo.

En conclusión, la materia de invención señalada en la reivindicación 1 se encuentra afectada en su nivel inventivo ya que se deriva de manera evidente del estado de la técnica y puede ser obvia para un técnico de nivel medio versado en la materia. Por tanto, no cumple con las disposiciones del artículo 18 de Decisión 486 de la Comisión de la Comunidad Andina.

5. Conclusión:

Los requisitos de patentabilidad de la presente solicitud se encuentran afectados así:

N°	Documento	Reivindicaciones afectadas	Requisito que afecta
D1	EP 0646611	1-12	Nivel Inventivo
D1	US 2001/0031811	1-12	Nivel Inventivo

En cumplimiento del artículo 45 de la Decisión 486 de la Comisión de la Comunidad Andina, se le indica que debe dar respuesta dentro del término de 60 días contados a partir de la fecha de notificación de la presente comunicación. En caso de no dar respuesta al presente requerimiento, o si a pesar de la respuesta subsistieran los impedimentos para la concesión, se denegará la patente.

Notifíquese el presente oficio conforme a lo dispuesto en el numeral 5.2, literal e), del capítulo quinto del título primero de la Circular Única N° 10 de 2001.

ALIX CARMENZA CÉSPEDES DE VERGEL
Jefe de División de Nuevas Creaciones

El anterior requerimiento fue notificado por fijación en lista, de fecha _____

CONCEPTO TÉCNICO No.159	**EXAMINADOR TÉCNICO** Código No.202076