cellosolve-based solvent, such as methyl cellosolve, ethyl cellosolve, butyl cellosolve, and n-propyl cellosolve. Examples of the aprotic polar solvent include acetone, dimethyl sulfoxide (DMSO), N,N-dimethylformamide (DMF), and pyridine.

[0024] There is provided an acrylic polymer as a component (C). The acrylic polymer is preferably a copolymer of: a monomer having a hydrophilic group to exhibit an affinity for pigment; and a monomer having a hydrophobic group to control compatibility and provide steric hindrance. Such an acrylic polymer enables the function-exhibiting substance to be uniformly dispersed due to the hydrophilic group adsorbing the function-exhibiting substance and the hydrophobic group suppressing aggregation of the function-exhibiting substance. The organo silica sol, which has a particle diameter of approximately 20 to 30 nm, forms an aggregation having a large particle diameter of 600 to 1000 nm when aggregating. Due to the organo silica sol being uniformly dispersed, light-scattering properties of a cured layer made of the functional composition is enhanced, thereby reducing a defect in appearance caused by interference of a light.

[0025] Examples of the hydrophilic group include an anionic group, such as a carboxyl group, a sulfonic acid group, and a phosphoric acid group, and a cationic group, such as an amino group and an ammonium group. Specific examples of the monomer having the hydrophilic group include acrylic acid, acrylamide, methacrylic acid, poly (ethylene glycol) acrylate and methacrylate, dimethylaminoethyl methacrylate, diethylaminoethyl methacrylate, t-butylaminoethyl methacrylate, dimethylaminoethyl acrylate, diethylaminoethyl acrylate, methacrylamide, dimethacrylamide, dimethylaminopropyl methacrylamide, ethylene glycol methacrylate phosphate, 2-(methacryloyloxy)methyl phthalate, 2-(methacryloyloxy)ethyl succinate, 3-sulfopropyl methacrylate, and 3-sulfopropyl acrylate.

[0026] Examples of the hydrophobic group include an alkyl group and a phenyl group.

Specifically, examples of the monomer having the hydrophobic group include methyl methacrylate, butyl methacrylate, hexyl acrylate, hexylethyl acrylate, benzyl acrylate, benzyl methacrylate, phenoxyethyl acrylate, phenoxyethyl methacrylate, and a mixture thereof.

[0027] In the composition described above, preferably 0.5 to 12 parts by mass, and more preferably 1 to 9 parts by mass of the organo silica sol of the component (B) is blended with respect to 1 part by mass (in terms of solid content) of the hydrolytic condensate of silicon alkoxide of the component (A). When a blending ratio of the component (B) is equal to or more than the lower limit, a function-exhibiting effect is improved. When the blending ratio of the component (B) is equal to or less than the upper limit, solvent resistance is improved.

[0028] Preferably 0.005 to 0.3 parts by mass, and more preferably 0.01 to 0.07 parts by mass (in terms of solid content) of the acrylic polymer of the component (C) having the hydrophilic group and the hydrophobic group is blended with respect to 1 part by mass (in terms of solid content) of the component (B). When a blending ratio of the component (C) exceeds the upper limit, aggregation properties of the colloidal silica increases. Thus, when the blending ratio of the component (C) is equal to or less than the upper limit, it is possible to reduce a defect in appearance caused by light interference in a low refractive index layer. Furthermore, when the blending ratio of the above component (C) is equal to or more than the lower limit, a blended solution has a suitable viscosity, thereby enabling formation of a uniform low refractive index layer. Accordingly, provided is a melamine decorative laminate that makes a fingerprint less noticeable and makes a pattern of a printed paper clearer.

[0029] The composition including (A) the hydrolytic condensate of silicon alkoxide, (B) the organo silica sol dispersed in the hydrophilic solvent, and (C) the acrylic polymer having the hydrophilic group and the hydrophobic group improves dispersibility of the function-exhibiting substance to be added. Specifically, the function-exhibiting substance enters into a lattice-like coating

product having both the odor reduction performance and the anti-allergen performance.

[0048] Furthermore, a total blending amount of the odor-reducing substance (m) and the anti-allergen substance (o) in the composition is preferably 30 to 160 parts by mass, and more preferably 35 to 110 parts by mass with respect to 100 parts by mass in solid content of the composition. When the total blending amount falls within this range, the decorative laminate is excellent particularly in the appearance, the odor reduction performance, and the anti-allergen performance. That is, when the total blending amount is less than the lower limit, the odor reduction performance and the anti-allergen performance are slightly worsened. When the total blending amount exceeds the upper limit, minor unevenness due to blushing is prone to occur in the appearance.

[0049] When the antiviral substance (n) and the anti-allergen substance (o) are combined, a blending ratio by mass of the antiviral substance (n) to the anti-allergen substance (o) is preferably 1:0.01 to 2.0, and more preferably 1:0.06 to 1.50. When the blending ratio is less than the lower limit and exceeds the upper limit, the melamine decorative laminate is slightly less balanced as the product having both the antiviral performance and the anti-allergen performance.

[0050] Furthermore, a total blending amount of the antiviral substance (n) and the anti-allergen substance (o) in the composition is preferably 15 to 200 parts by mass, and more preferably 35 to 125 parts by mass with respect to 100 parts by mass in solid content of the composition. When the total blending amount falls within this range, the decorative laminate is excellent particularly in the appearance, the antiviral performance, and the anti-allergen performance. That is, when the total blending amount is less than the lower limit, the antiviral performance and the anti-allergen performance are slightly worsened. When the total blending amount exceeds the upper limit, the unevenness due to blushing is prone to occur in the appearance.

[0051] When the odor-reducing substance (m), the antiviral substance (n), and the anti-allergen substance (o) are combined, a blending ratio by mass of the odor-

place of the prepreg, and the backer was not used.

[0131] [Example 52]

A melamine decorative laminate was produced in the same manner as in Example 29, except that the phenol resin-impregnated core paper was used in place of the prepreg, and the backer was not used.

[0132] [Example 53]

A melamine decorative laminate was produced in the same manner as in Example 1, except that zeolite was used as the odor-reducing substance (m).

[0133] [Example 54]

A melamine decorative laminate was produced in the same manner as in Example 1, except that copper oxide was used as the odor-reducing substance (m).

[0134] [Example 55]

A melamine decorative laminate was produced in the same manner as in Example 1, except that zirconium oxide was used as the odor-reducing substance (m).

[0135] [Example 56]

A melamine decorative laminate was produced in the same manner as in Example 14, except that amino-modified polyvinyl alcohol particles were used as the antiviral substance (n).

[0136] [Example 57]

A melamine decorative laminate was produced in the same manner as in Example 14, except that amino-modified acrylic particles were used as the antiviral substance (n).

[0137] [Example 58]

A melamine decorative laminate was produced in the same manner as in Example 23, except that acidic anion-modified polyvinyl alcohol was used, as the anion-modified organic compound in the anti-allergen substance (o), in place of sodium salt of acidic anion-modified linear alkane.

[0138] [Example 59]

A melamine decorative laminate was produced in the same manner as in Example 23, except that silver oxide particles were used, as the carrier in the anti-allergen substance (o), in place of styrene particles.

[0139] [Example 60]

A melamine decorative laminate was produced in the same manner as in Example 1, except that the composition including the components (A), (B), and (C) obtained in Example 1 was used in place of the odor-reducing function exhibiting composition (M).

[0140] [Example 61]

A melamine decorative laminate was produced in the same manner as in Example 1, except that a melamine resin-impregnated patterned paper (Mt) and production methods to be described below were used.

[0141] <Production of Melamine Resin-impregnated Patterned Paper (Mt)>

A decorative paper for a decorative laminate having a basis weight of 100 $g/m^2$ and brown color was impregnated with a resin liquid (AA) composed mainly of a melamine-formaldehyde resin such that the impregnation rate defined by Formula 1 is 140%. Then, the decorative paper was coated with the coating liquid containing the odor-reducing function exhibiting composition (M) according to Example 1 such that the coating thickness after drying is 4.5 μm. Accordingly, a melamine resin-impregnated patterned paper (Mt) was obtained. The surface of the decorative paper was printed with a wood grain pattern having wood conduit pattern part.

[0142] <Production of Decorative Laminate>

A melamine decorative laminate was obtained by: stacking one sheet of the backer, five sheets of the prepreg, and one sheet of the melamine resin-impregnated patterned paper (Mt) in this order from the bottom; and forming the stacked product under heat and pressure with a flat finish plate under the conditions of: 140°C, 100 $kg/cm^2$, and 90 minutes.

[0143] [Example 62]

A decorative laminate was produced in the same manner as in Example 14,

| | Composition | | | | | Function-exhibiting Substance | | |
|---|---|---|---|---|---|---|---|---|
| | A | B | C | | | m | n | o |
| | Parts by mass | Parts by mass | Parts by mass | B:A | C:B | Blending amount per 100 parts by mass of composition | Blending amount per 100 parts by mass of composition | Blending amount per 100 parts by mass of composition |
| Example 1 | 100 | 600 | 13.2 | 6 | 0.022 | 40 | — | — |
| Example 2 | 100 | 600 | 13.2 | 6 | 0.022 | 60 | — | — |
| Example 3 | 100 | 600 | 13.2 | 6 | 0.022 | 30 | — | — |
| Example 4 | 100 | 600 | 9.3 | 6 | 0.016 | 40 | — | — |
| Example 5 | 100 | 600 | 16.8 | 6 | 0.028 | 40 | — | — |
| Example 6 | 100 | 400 | 13.2 | 4 | 0.033 | 40 | — | — |
| Example 7 | 100 | 900 | 13.2 | 9 | 0.015 | 40 | — | — |
| Example 8 | 100 | 600 | 13.2 | 6 | 0.022 | 40 | — | — |
| Example 9 | 100 | 600 | 13.2 | 6 | 0.022 | 40 | — | — |
| Example 10 | 100 | 600 | 13.2 | 6 | 0.022 | 40 | — | — |
| Example 11 | 100 | 600 | 13.2 | 6 | 0.022 | 40 | — | — |
| Example 12 | 100 | 600 | 13.2 | 6 | 0.022 | 40 | — | — |
| Example 13 | 100 | 600 | 13.2 | 6 | 0.022 | 40 | — | — |
| Example 14 | 100 | 600 | 13.2 | 6 | 0.022 | — | 50 | — |
| Example 15 | 100 | 600 | 26.4 | 6 | 0.044 | — | 35 | — |
| Example 16 | 100 | 600 | 26.4 | 6 | 0.044 | — | 75 | — |
| Example 17 | 100 | 600 | 9.3 | 6 | 0.016 | — | 50 | — |
| Example 18 | 100 | 600 | 16.8 | 6 | 0.028 | — | 50 | — |
| Example 19 | 100 | 600 | 26.4 | 6 | 0.044 | — | 50 | — |
| Example 20 | 100 | 600 | 26.4 | 6 | 0.044 | — | 50 | — |
| Example 21 | 100 | 600 | 26.4 | 6 | 0.044 | — | 50 | — |
| Example 22 | 100 | 600 | 26.4 | 6 | 0.044 | — | 50 | — |
| Example 23 | 100 | 600 | 13.2 | 6 | 0.022 | — | — | 10 |
| Example 24 | 100 | 600 | 13.2 | 6 | 0.022 | — | — | 3 |
| Example 25 | 100 | 600 | 13.2 | 6 | 0.022 | — | — | 50 |
| Example 26 | 100 | 600 | 13.2 | 6 | 0.022 | — | — | 10 |
| Example 27 | 100 | 600 | 13.2 | 6 | 0.022 | — | — | 10 |
| Example 28 | 100 | 600 | 13.2 | 6 | 0.022 | — | — | 10 |
| Example 29 | 100 | 600 | 13.2 | 6 | 0.022 | — | — | 10 |
| Example 30 | 100 | 900 | 13.2 | 9 | 0.015 | — | — | 10 |
| Example 31 | 100 | 300 | 13.2 | 3 | 0.044 | — | — | 10 |

[0172] [Table 1-2]

[0173] [Table 2-1]

| | Composition | | | | | Function-exhibiting substance | | |
|---|---|---|---|---|---|---|---|---|
| | A | B | C | | | m | n | o |
| | Parts by mass | Parts by mass | Parts by mass | B:A | C:B | Blending amount per 100 parts by mass of composition | Blending amount per 100 parts by mass of composition | Blending amount per 100 parts by mass of composition |
| Example 32 | 100 | 600 | 13.2 | 6 | 0.022 | 40 | — | — |
| Example 33 | 100 | 600 | 13.2 | 6 | 0.022 | 60 | — | — |
| Example 34 | 100 | 600 | 13.2 | 6 | 0.022 | 30 | — | — |
| Example 35 | 100 | 600 | 13.2 | 6 | 0.022 | 40 | — | — |
| Example 36 | 100 | 600 | 13.2 | 6 | 0.022 | 40 | — | — |
| Example 37 | 100 | 600 | 13.2 | 6 | 0.022 | 40 | — | — |
| Example 38 | 100 | 600 | 13.2 | 6 | 0.022 | 40 | — | — |
| Example 39 | 100 | 600 | 13.2 | 6 | 0.022 | — | 50 | — |
| Example 40 | 100 | 600 | 26.4 | 6 | 0.044 | — | 35 | — |
| Example 41 | 100 | 600 | 26.4 | 6 | 0.044 | — | 75 | — |
| Example 42 | 100 | 600 | 26.4 | 6 | 0.044 | — | 50 | — |
| Example 43 | 100 | 600 | 26.4 | 6 | 0.044 | — | 50 | — |
| Example 44 | 100 | 600 | 26.4 | 6 | 0.044 | — | 50 | — |
| Example 45 | 100 | 600 | 26.4 | 6 | 0.044 | — | 50 | — |
| Example 46 | 100 | 600 | 13.2 | 6 | 0.022 | — | — | 10 |
| Example 47 | 100 | 600 | 13.2 | 6 | 0.022 | — | — | 3 |
| Example 48 | 100 | 600 | 13.2 | 6 | 0.022 | — | — | 50 |
| Example 49 | 100 | 600 | 13.2 | 6 | 0.022 | — | — | 10 |
| Example 50 | 100 | 600 | 13.2 | 6 | 0.022 | — | — | 10 |
| Example 51 | 100 | 600 | 13.2 | 6 | 0.022 | — | — | 10 |
| Example 52 | 100 | 600 | 13.2 | 6 | 0.022 | — | — | 10 |

[0174] [Table 2-2]

| | Composition | | | | | Function-exhibiting substance | | |
|---|---|---|---|---|---|---|---|---|
| | A | B | C | | | m | n | o |
| | Parts by mass | Parts by mass | Parts by mass | B:A | C:B | Blending amount per 100 parts by mass of composition | Blending amount per 100 parts by mass of composition | Blending amount per 100 parts by mass of composition |
| Example 53 | 100 | 600 | 13.2 | 6 | 0.022 | 40 | | |
| Example 54 | 100 | 600 | 13.2 | 6 | 0.022 | 40 | | |
| Example 55 | 100 | 600 | 13.2 | 6 | 0.022 | 40 | | |
| Example 56 | 100 | 600 | 13.2 | 6 | 0.022 | — | 50 | |
| Example 57 | 100 | 600 | 13.2 | 6 | 0.022 | — | 50 | |
| Example 58 | 100 | 600 | 13.2 | 6 | 0.022 | — | — | 10 |
| Example 59 | 100 | 600 | 13.2 | 6 | 0.022 | — | — | 10 |
| Example 60 | 100 | 600 | 13.2 | 6 | 0.022 | — | — | — |
| Example 61 | 100 | 600 | 13.2 | 6 | 0.022 | 40 | — | — |
| Example 62 | 100 | 600 | 13.2 | 6 | 0.022 | — | 50 | — |
| Example 63 | 100 | 600 | 13.2 | 6 | 0.022 | — | — | 10 |

[0176] [Table 3-2]

| | Particle diameter of function-exhibiting substance /nm | pH of coating liquid | Coating amount (dry) /μm | Core material |
|---|---|---|---|---|
| Example 53 | 350 | 5.8 | 4.5 | Prepreg |
| Example 54 | 350 | 5.8 | 4.5 | Prepreg |
| Example 55 | 350 | 5.8 | 4.5 | Prepreg |
| Example 56 | 1000 | 8.3 | 2.2 | Prepreg |
| Example 57 | 1000 | 8.3 | 2.2 | Prepreg |
| Example 58 | 2000 | 8.5 | 4.0 | Prepreg |
| Example 59 | 2000 | 6.8 | 4.0 | Prepreg |
| Example 60 | - | 6.8 | 4.0 | Prepreg |
| Example 61 | 350 | 5.8 | 4.5 | Prepreg |
| Example 62 | 1000 | 8.3 | 2.2 | Prepreg |
| Example 63 | 2000 | 6.8 | 4.0 | Prepreg |

| | Composition | | | | | Function-exhibiting composition | | | Blending ratio | | | Total | Total | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | | | m | n | o | | | | | | |
| | Parts by mass | Parts by mass | Parts by mass | B:A | C:B | Blending amount per 100 parts by mass of composition | Blending amount per 100 parts by mass of composition | Blending amount per 100 parts by mass of composition | n:m | o:m | o:n | m+n | m+o | n+o |
| Example 64 | 100 | 600 | 13.2 | 6 | 0.022 | 40 | 50 | — | 1.25 | | | 90 | | |
| Example 65 | 100 | 600 | 13.2 | 6 | 0.022 | 30 | 50 | — | 1.67 | | | 80 | | |
| Example 66 | 100 | 600 | 13.2 | 6 | 0.022 | 60 | 50 | — | 0.83 | | | 110 | | |
| Example 67 | 100 | 600 | 13.2 | 6 | 0.022 | 40 | 35 | — | 0.88 | | | 75 | | |
| Example 68 | 100 | 600 | 13.2 | 6 | 0.022 | 40 | 75 | — | 1.88 | | | 115 | | |
| Example 69 | 100 | 600 | 13.2 | 6 | 0.022 | 40 | — | 10 | | 0.25 | | | 50 | |
| Example 70 | 100 | 600 | 13.2 | 6 | 0.022 | 30 | — | 10 | | 0.33 | | | 40 | |
| Example 71 | 100 | 600 | 13.2 | 6 | 0.022 | 60 | — | 10 | | 0.17 | | | 70 | |
| Example 72 | 100 | 600 | 13.2 | 6 | 0.022 | 40 | — | 3 | | 0.08 | | | 43 | |
| Example 73 | 100 | 600 | 13.2 | 6 | 0.022 | 40 | — | 50 | | 1.25 | | | 90 | |
| Example 74 | 100 | 600 | 13.2 | 6 | 0.022 | — | 50 | 10 | | | 0.20 | | | 60 |
| Example 75 | 100 | 600 | 13.2 | 6 | 0.022 | — | 35 | 10 | | | 0.29 | | | 45 |
| Example 76 | 100 | 600 | 13.2 | 6 | 0.022 | — | 75 | 10 | | | 0.13 | | | 85 |
| Example 77 | 100 | 600 | 13.2 | 6 | 0.022 | — | 50 | 3 | | | 0.06 | | | 53 |
| Example 78 | 100 | 600 | 13.2 | 6 | 0.022 | — | 50 | 50 | | | 1.00 | | | 100 |

| | Composition | | | | | Function-exhibiting composition | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | | | m | n | o | Blending ratio | | | Total |
| | Parts by mass | Parts by mass | Parts by mass | B:A | C:B | Blending amount per 100 parts by mass of composition | Blending amount per 100 parts by mass of composition | Blending amount per 100 parts by mass of composition | m:m | n:m | o:m | m+n+o |
| Example 79 | 100 | 600 | 13.2 | 6 | 0.022 | 20 | 40 | 10 | 1 | 2.00 | 0.50 | 70 |
| Example 80 | 100 | 600 | 13.2 | 6 | 0.022 | 10 | 40 | 10 | 1 | 4.00 | 1.00 | 60 |
| Example 81 | 100 | 600 | 13.2 | 6 | 0.022 | 60 | 40 | 10 | 1 | 0.67 | 0.17 | 110 |
| Example 82 | 100 | 600 | 13.2 | 6 | 0.022 | 20 | 20 | 10 | 1 | 1.00 | 0.50 | 50 |
| Example 83 | 100 | 600 | 13.2 | 6 | 0.022 | 20 | 70 | 10 | 1 | 3.50 | 0.50 | 100 |
| Example 84 | 100 | 600 | 13.2 | 6 | 0.022 | 20 | 40 | 5 | 1 | 2.00 | 0.25 | 65 |
| Example 85 | 100 | 600 | 13.2 | 6 | 0.022 | 20 | 40 | 60 | 1 | 2.00 | 3.00 | 120 |
| Example 86 | 100 | 600 | 13.2 | 6 | 0.022 | 20 | 40 | 10 | 1 | 2.00 | 0.50 | 70 |
| Example 87 | 100 | 600 | 13.2 | 6 | 0.022 | 20 | 40 | 10 | 1 | 2.00 | 0.50 | 70 |
| Example 88 | 100 | 600 | 13.2 | 6 | 0.022 | 20 | 40 | 10 | 1 | 2 | 0.5 | 70 |
| Example 89 | 100 | 600 | 13.2 | 6 | 0.022 | 20 | 40 | 10 | 1 | 2 | 0.5 | 70 |
| Example 90 | 100 | 600 | 13.2 | 6 | 0.022 | 20 | 40 | 10 | 1 | 2 | 0.5 | 70 |
| Example 91 | 100 | 600 | 13.2 | 6 | 0.022 | 20 | 40 | 10 | 1 | 2 | 0.5 | 70 |
| Example 92 | 100 | 600 | 13.2 | 6 | 0.022 | 20 | 40 | 10 | 1 | 2 | 0.5 | 70 |
| Example 93 | 100 | 600 | 13.2 | 6 | 0.022 | 20 | 40 | 10 | 1 | 2 | 0.5 | 70 |
| Example 94 | 100 | 600 | 13.2 | 6 | 0.022 | 20 | 40 | 10 | 1 | 2.00 | 0.50 | 70 |
| Example 95 | 100 | 600 | 13.2 | 6 | 0.022 | 10 | 40 | 10 | 1 | 4.00 | 1.00 | 60 |
| Example 96 | 100 | 600 | 13.2 | 6 | 0.022 | 60 | 40 | 10 | 1 | 0.67 | 0.17 | 110 |

| | Composition | | | | | Function-exhibiting composition | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | | | m | n | o | Blending ratio | | | Total |
| | Parts by mass | Parts by mass | Parts by mass | B:A | C:B | Blending amount per 100 parts by mass of composition | Blending amount per 100 parts by mass of composition | Blending amount per 100 parts by mass of composition | m:m | n:m | o:m | m+n+o |
| Experiment Example 1 | 100 | 600 | 13.2 | 6 | 0.022 | 3 | 20 | 10 | 1 | 6.67 | 3.33 | 33 |
| Experiment Example 2 | 100 | 600 | 13.2 | 6 | 0.022 | 90 | 40 | 10 | 1 | 0.44 | 0.11 | 140 |
| Experiment Example 3 | 100 | 600 | 13.2 | 6 | 0.022 | 20 | 5 | 10 | 1 | 0.25 | 0.50 | 35 |
| Experiment Example 4 | 100 | 600 | 13.2 | 6 | 0.022 | 20 | 100 | 10 | 1 | 5.00 | 0.50 | 130 |
| Experiment Example 5 | 100 | 600 | 13.2 | 6 | 0.022 | 20 | 20 | 1 | 1 | 1.00 | 0.05 | 41 |
| Experiment Example 6 | 100 | 600 | 13.2 | 6 | 0.022 | 20 | 40 | 100 | 1 | 2.00 | 5.00 | 160 |

[0184] [Table 7-2]

| | Particle diameter of function-exhibiting composition /nm | | | pH of coating liquid | Coating amount (dry) /μm | Core material |
|---|---|---|---|---|---|---|
| | m | n | o | | | |
| Experiment Example 1 | 350 | 1000 | 2000 | 7.6 | 4.0 | Prepreg |
| Experiment Example 2 | 350 | 1000 | 2000 | 7.5 | 4.0 | Prepreg |
| Experiment Example 3 | 350 | 1000 | 2000 | 7.4 | 4.0 | Prepreg |
| Experiment Example 4 | 350 | 1000 | 2000 | 7.3 | 4.0 | Prepreg |
| Experiment Example 5 | 350 | 1000 | 2000 | 7.5 | 4.0 | Prepreg |
| Experiment Example 6 | 350 | 1000 | 2000 | 7.6 | 4.0 | Prepreg |

[0185] [Table 8-1]

| | Composition | | | | | Function-exhibiting composition | | |
|---|---|---|---|---|---|---|---|---|
| | A | B | C | | | m | n | o |
| | Parts by mass | Parts by mass | Parts by mass | B:A | C:B | Blending amount per 100 parts by mass of composition | Blending amount per 100 parts by mass of composition | Blending amount per 100 parts by mass of composition |
| Experiment Example 7 | 100 | less than 50 | 13.2 | less than 0.5 | more than 0.264 | 40 | — | — |
| Experiment Example 8 | 100 | more than 1200 | 13.2 | more than 12 | less than 0.011 | 40 | — | — |
| Experiment Example 9 | 100 | 600 | less than 3 | 6 | less than 0.005 | 40 | — | — |
| Experiment Example 10 | 100 | 600 | more than 180 | 6 | more than 0.3 | 40 | — | — |

[0186] [Table 8-2]

| | Composition | | | | | Function-exhibiting composition | | | Blending ratio | | | Total | Total | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | | | m | n | o | | | | | | |
| | Parts by mass | Parts by mass | Parts by mass | B:A | C:B | Blending amount per 100 parts by mass of composition | Blending amount per 100 parts by mass of composition | Blending amount per 100 parts by mass of composition | n:m | o:m | o:n | m+n | m+o | n+o |
| Experiment Example 11 | 100 | 600 | 13.2 | 6 | 0.022 | 20 | 50 | — | 2.50 | | | 70 | | |
| Experiment Example 12 | 100 | 600 | 13.2 | 6 | 0.022 | 100 | 50 | — | 0.50 | | | 150 | | |
| Experiment Example 13 | 100 | 600 | 13.2 | 6 | 0.022 | 40 | 20 | — | 0.50 | | | 60 | | |
| Experiment Example 14 | 100 | 600 | 13.2 | 6 | 0.022 | 40 | 85 | — | 2.13 | | | 125 | | |
| Experiment Example 15 | 100 | 600 | 13.2 | 6 | 0.022 | 20 | — | 10 | | 0.50 | | | 30 | |
| Experiment Example 16 | 100 | 600 | 13.2 | 6 | 0.022 | 150 | — | 10 | | 0.07 | | | 160 | |
| Experiment Example 17 | 100 | 600 | 13.2 | 6 | 0.022 | 30 | — | 1 | | 0.03 | | | 31 | |
| Experiment Example 18 | 100 | 600 | 13.2 | 6 | 0.022 | 40 | — | 80 | | 2.00 | | | 120 | |
| Experiment Example 19 | 100 | 600 | 13.2 | 6 | 0.022 | — | 5 | 10 | | | 2.00 | | | 15 |
| Experiment Example 20 | 100 | 600 | 13.2 | 6 | 0.022 | — | 190 | 10 | | | 0.05 | | | 200 |
| Experiment Example 21 | 100 | 600 | 13.2 | 6 | 0.022 | — | 30 | 0 | | | 0.00 | | | 30 |
| Experiment Example 22 | 100 | 600 | 13.2 | 6 | 0.022 | — | 50 | 80 | | | 1.60 | | | 130 |

and a side surface of a test specimen cut to a size of 100 mm×200 mm were covered with an aluminum tape such that an effective area of the test specimen is 200 $cm^2$. The test specimen was put in a Tedlar bag, and thereafter three liters of ammonia gas was injected in the Tedlar bag such that a concentration of the ammonia gas is 100 ppm therein. After elapse of 24 hours, a residual concentration of ammonia was measured. Based on a value measured, a calculation was made to a total amount of odor reduction of ammonia, which was defined as an odor reduction rate (%) of the ammonia gas.

[0197] (3) Phage Test on Antiviral Performance

Test virus: Bacteriophage Qβ

Test Standard: JIS R 1756:2020 “Fine ceramics (advanced ceramics, advanced technical ceramics) -Determination of antiviral activity of photocatalytic materials under indoor lighting environment- Test method using bacteriophage Q-beta”

Measurement period of time: 24 hours

A test specimen cut to a size of 50 mm×50 mm was brought into contact with a test bacteria, the Bacteriophage Qβ. After 24 hours, a test bacteria solution was collected and a virus infectivity titer was calculated. Based on the virus infectivity titer calculated, an antiviral activity was calculated in accordance with the following Formula.

[0198] Antiviral activity=log (virus infectivity titer of unworked product)-log (virus infectivity titer of worked product)

The unworked product means a melamine decorative laminate in which a cured layer made of the composition has not been formed. The worked product means the melamine decorative laminate according to each of Examples, Experiment Examples, and Comparative Examples.

[0199] (4) Anti-allergen Performance

Test bacteria: mite allergens (Der fII), cedar pollen allergens (Cry jI)

Measurement period of time: 24 hours

Measurement method: ELISA method

# CLAIMS

1. A composition comprising:

a hydrolytic condensate of silicon alkoxide (A);

an organo silica sol dispersed in a hydrophilic solvent (B); and

an acrylic polymer having a hydrophilic group and a hydrophobic group (C).

2. The composition according to claim 1, wherein the composition includes at least one substance selected from a group consisting of an odor-reducing substance (m), an antiviral substance (n), and an anti-allergen substance (o).

3. The composition according to claim 2,

wherein the composition includes the odor-reducing substance (m), and

wherein a blending amount of the odor-reducing substance (m) in the composition is 30 to 60 parts by mass with respect to 100 parts by mass in solid content of the composition.

4. The composition according to claim 2 or 3,

wherein the composition includes the antiviral substance (n), and

wherein a blending amount of the antiviral substance (n) in the composition is 35 to 75 parts by mass with respect to 100 parts by mass in solid content of the composition.

5. The composition according to any one of claims 2 to 4,

wherein the composition includes the anti-allergen substance (o), and

wherein a blending amount of the anti-allergen substance (o) in the composition is 3 to 50 parts by mass with respect to 100 parts by mass in solid content of the composition.

6. The composition according to any one of claims 2 to 5,

wherein the composition includes the odor-reducing substance (m), and

wherein the odor-reducing substance (m) includes an odor-reducing substance of chemical adsorption type.

7. The composition according to claim 6, wherein the odor-reducing substance of the chemical adsorption type includes at least one selected from a group consisting of zinc oxide, silica, zeolite, copper oxide, and zirconium oxide.

8. The composition according to any one of claims 2 to 7,

wherein the composition includes the antiviral substance (n), and

wherein the antiviral substance (n) includes at least one selected from a group consisting of a triazine-thiazole-imidazole-based substance, amino-modified polyvinyl alcohol, and an amino-modified acrylic polymer.

9. The composition according to any one of claims 2 to 8,

wherein the composition includes the anti-allergen substance (o), and

wherein the anti-allergen substance (o) includes a composite of an anion-modified organic compound and a carrier.

10. The composition according to claim 9, wherein the anion-modified organic compound includes at least one selected from a group consisting of anion-modified linear alkane and anion-modified polyvinyl alcohol.

11. The composition according to claim 9 or 10, wherein the carrier includes at least one selected from a group consisting of styrene particles and silver oxide particles.

12. The composition according to any one of claims 1 to 11, wherein the composition is used for a melamine decorative laminate.

13. A transfer sheet comprising:

a sheet-like base material; and

a cured layer made of the composition according to any one of claims 1 to 12,

the cured layer being formed on one side surface of the sheet-like base material.

14. A melamine decorative laminate comprising:

a core layer;

a decorative layer including a cured product made of melamine resin; and

a cured layer made of the composition according to any one of claims 1 to 12 in this order.

15. A method of producing a melamine decorative laminate, the method comprising:

providing the melamine decorative laminate with a core layer, a decorative layer including a cured product made of melamine resin, and a front surface layer in this order; and

curing the composition according to any one of claims 1 to 12 to thereby form the front surface layer.