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I, Eric Vance, hereby declare:

That I possess advanced knowledge of the Japanese and English languages. The attached Japanese into English translation has been translated by me and to the best of my knowledge and belief, it is a true and accurate translation of: JP 2017114041 A.

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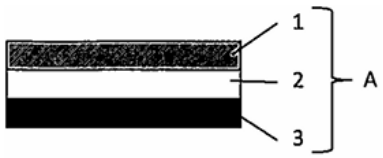
(54) [Title of Invention] REFLECTIVE LIGHT SHIELDING LAMINATE

(57) [Abstract]
[Problem] To provide a light shielding laminate that does not require a lamination step or vapor deposition step for imparting light shielding properties, has excellent whiteness and brightness, and for which it is possible to laminate a pattern printing layer by back printing.
[Resolution Means] A reflective light shielding laminate having a substrate layer, a shielding layer, and a light shielding layer adjacent to the shielding layer, wherein the light shielding layer is one or more printing layers composed of white ink, and the light shielding layer is a printing layer composed of light shielding ink containing binder resin and aluminum particles.
[Selected Drawing] FIG. 1



[Scope of Patent Claims]
[Claim 1]
A reflective light shielding laminate having a substrate layer, a shielding layer, and a light shielding layer adjacent to the shielding layer, wherein
the light shielding layer is one or more printing layers composed of white ink, and
the light shielding layer is a printing layer composed of light shielding ink containing binder resin and aluminum particles.
[Claim 2]
The reflective light shielding laminate according to claim 1, wherein a pattern printing layer composed of printing ink is disposed between the substrate layer and the shielding layer.
[Claim 3]
The reflective light shielding laminate according to claim 1, wherein a pattern printing layer composed of printing ink is disposed on a surface opposite to the surface of the substrate layer on which the shielding is provided.
[Claim 4]
The reflective light shielding laminate according to any one of claims 1 to 3, wherein, in a portion of the laminate that is not provided with a picture printing layer, a brightness L* value of an L*a*b* surface color system measured from a side opposite to the side of the substrate layer that is provided with the shielding layer is 82 or more.
[Claim 5]
The reflective light shielding laminate according to any one of claims 1 to 4, wherein a heat seal layer is further disposed on the light shielding layer.
[Detailed Description of Invention]
[Technical Field]
[0001]
The present invention relates to a reflective light shielding laminate and a packaging material composed of such.
[Background Art]
[0002]
Conventionally, various packaging materials and packaging containers and bags composed of such have been developed and proposed for packaging articles such as various foods and drinks, chemical or cosmetic products such as liquid detergents, pharmaceuticals, miscellaneous goods, and industrial materials.

As laminates applied to this packaging material, various light shielding materials having the property of blocking light transmission have been attempted in response to demand for protection of quality of contents, extension of shelf life, and the like. That is, when sunlight, room light, or the like passes through the packaging material and hits the contents, there is a problem in that the contents decompose, change, or photodegrade, such as fading, and various light shielding materials have been developed and proposed.
[0003]
Aluminum foil, aluminum vapor deposited film, and the like are commonly used as the light shielding material described above. However, there is a problem in that these require multiple processes such as a dry lamination step or a vapor deposition step with a substrate film, which results in manufacturing costing time and money.

Therefore, instead of aluminum foil or aluminum deposited film, a light shielding paint film is formed on the substrate film using an ink or paint containing a black or gray colorant. However,

when such a light shielding paint film is formed, a white ink layer is provided at the maximum thickness permitted by manufacturing conditions to shield the black or gray tones thereof, and the film cannot obtain sufficient whiteness and brightness. Therefore, there is a problem in that the pattern printing layer provided on the surface thereof is affected by the black color tone of the light shielding layer, the desired color cannot be obtained as a packaging product, and the designability and decorative properties are impaired.

[0004]

In contrast, it has been proposed to provide a light shielding paint film that is black or the like on a back surface (side that contacts the contents) of a white substrate film, and to provide a picture printing layer on the opposite surface by front printing. However, the substrate film itself is white and not transparent, and thus there is a problem in that the picture printing layer cannot be provided by back printing and cannot be applied to various applications that avoid peeling of the printing layer due to friction. Furthermore, even when the black light shielding paint film is shielded by the white film, sufficient whiteness and brightness are not obtained. (See patent documents 1 to 4 and the like.)

[Prior Art Documents]

[Patent Documents]

[0005]

[Patent Document 1] JP H6-67358 A

[Patent Document 2] JP H6-182924 A

[Patent Document 3] JP H7-52328 A

[Patent Document 4] JP H9-24583 A

[Summary of Invention]

[Problem to Be Solved by Invention]

[0006]

An object of the present invention is to solve the above problems and provide a light shielding laminate that does not require a lamination step or vapor deposition step for imparting light shielding properties, has excellent whiteness and brightness, and for which it is possible to laminate a pattern printing layer by back printing.

[Means for Solving Problem]

[0007]

As a result of various studies, the present inventors have found that the above object is achieved by a reflective light shielding laminate having a substrate layer, a shielding layer, and a light shielding layer adjacent to the shielding layer, wherein the light shielding layer is one or more layers formed by printing white ink, and the light shielding layer is a layer formed by printing light shielding ink containing binder resin and aluminum particles.

[0008]

That is, the present invention is characterized by the following points.

(1) A reflective light shielding laminate having a substrate layer, a shielding layer, and a light shielding layer adjacent to the shielding layer, wherein the light shielding layer is one or more printing layers composed of white ink, and the light shielding layer is a printing layer composed of light shielding ink containing binder resin and aluminum particles.

(2) The reflective light shielding laminate according to (1) above, wherein a pattern printing layer composed of printing ink is disposed between the substrate layer and the shielding layer.

(3) The reflective light shielding laminate according to (1) above, wherein a pattern printing layer composed of printing ink is disposed on a surface opposite to the surface of the substrate layer on

which the shielding is provided.
(4) The reflective light shielding laminate according to any one of (1) to (3) above, wherein, in a portion of the laminate that is not provided with a picture printing layer, a brightness L* value of an L*a*b* surface color system measured from a side opposite to the side of the substrate layer that is provided with the shielding layer is 82 or more.
(5) The reflective light shielding laminate according to any one of (1) to (4) above, wherein a heat seal layer is further disposed on the light shielding layer.
[Effect of Invention]
[0009]

Compared to light shielding laminates that use aluminum foil or a deposited film, the reflective light shielding laminate of the present invention may be laminated using only printing to impart light shielding properties, and thus requires less time and cost in manufacturing. In addition, compared to using black or gray light shielding inks, the ink has higher whiteness and brightness and has less influence on the pattern printing layer, and thus has excellent design and decoration. In addition, it is possible to print not only on the front side but also on the back side, and thus this may be applied to a wide variety of applications to avoid detachment of the picture printing layer due to friction.

Furthermore, when a heat-shrinkable resin film is used as the substrate layer, the density of the light shielding layer is increased and the light shielding property is significantly increased by heat-shrinking (shrinking) the substrate after the light shielding layer is provided. Therefore, this may be fitted to any shape container such as a horn, a round shape, a gourd shape, and the like, and the contents may be protected by quickly covering some or all of a mouth part, shoulder part, body part, and the like. Furthermore, unlike the case where the container itself is made light shielding, light shielding by shrink film that is separable from the container has excellent environmental advantages.
[Brief Description of Drawings]
[0010]
[FIG. 1] A schematic cross-sectional view illustrating one example of a layered configuration of the reflective light shielding laminate of the present invention.
[FIG. 2] A schematic cross-sectional view illustrating another example of the reflective light shielding laminate of the present invention.
[FIG. 3] A schematic cross-sectional view illustrating another example of the reflective light shielding laminate of the present invention.
[FIG. 4] A schematic cross-sectional view illustrating one example of a packaging material using the reflective light shielding laminate of the present invention.
[FIG. 5] A schematic cross-sectional view illustrating another example of a packaging material using the reflective light shielding laminate of the present invention.
[FIG. 6] A schematic perspective view illustrating a state of a cylindrical shrink label composed of the reflective light shielding laminate of the present invention.
[FIG. 7] A graph showing the evaluation results of the light shielding evaluation test.
[Embodiments of Invention]
[0011]

The present invention described above will be described in further detail below.
<1> Layer configuration of laminate of present invention and packaging material using such

FIG. 1 is a schematic cross-sectional view illustrating one example of a layered configuration of the reflective light shielding laminate of the present invention. As illustrated in FIG. 1, the laminate

of the present invention has a basic structure composed of a substrate layer 1, a shielding layer 2, and a light shielding layer 3 printed on the shielding layer 2. Here, the shielding layer 2 is a layer formed by printing one or more layers of white ink. Furthermore, the light shielding layer 3 is a layer formed by printing the light shielding ink on the shielding layer 2. Although not illustrated, a slipperiness imparting layer that protects the light shielding layer 3 and imparts slipperiness may be provided by further printing the white ink on the light shielding layer 3 to form the innermost surface when applied to the packaging material.

As illustrated in FIG. 2, a pattern printing layer 4 may be provided between the substrate layer 1 and the shielding layer 2, wherein printing ink is back printed on the substrate layer 1. Alternatively, as illustrated in FIG. 3, a pattern printing layer 6 may be provided on an opposite side (outer surface side) from the surface on which the shielding layer of the substrate layer is provided so as to be printed by front printing the printing ink. Prior to front printing, the white ink may be solid printed on the substrate layer to provide the white ink layer 5. In addition, a surface protection layer composed of an overprint varnish (OP varnish) or the like may be provided on the picture printing layer 6.

The laminate of the present invention may be used by itself as a packaging material such as shrink labels. Alternatively, as illustrated in FIG. 4 or FIG. 5, an intermediate layer C such as a barrier layer or a reinforcing layer and/or a heat seal layer B may be provided on an inner surface side (back surface side).

Next, materials constituting the laminate of the present invention, manufacturing methods thereof, and the like will be described. Furthermore, resin names used in the present invention are those conventionally used in the industry.

[0012]

<2> Substrate layer

In the present invention, the substrate layer may use various resins mainly composed of polyolefin resins such as low-density polyethylene, medium-density polyethylene, high-density polyethylene, linear low-density polyethylene, polypropylene, and ethylene-propylene copolymers, ionomer resins, ethylene-acrylate copolymers, ethylene-ethyl acrylate copolymers, polybutene resins, polymethylpentene resins, polyacrylate resins, polyacrylic resins, polyacrylitrile resins, polyethylene terephthalate (PET) and polyethylene naphthalate, polyamide resins such as nylon, polystyrene resins, polyvinyl chloride resins, polyvinylidene chloride resins, saponified ethylene-vinyl carbonate copolymers, polycarbonate resins, fluorine resins, and synthetic resins such as cellophane and vinylon.

These may be used alone, two or more resins may be blended, or a multilayer film in which two or more layers are laminated may also be used. Furthermore, even when these films are unstretched, they may be stretched in a uniaxial direction, biaxial directions, or the like. Furthermore, the film may be a heat-shrinkable stretching film or may be non-heat-shrinkable.

[0013]

When heat-shrinkable, in addition to those formed by a single layer, a heat-shrinkable film having a laminated configuration formed by laminating multiple layers may also be used. In addition, uniaxially-oriented heat-shrinkable films are usually used, but biaxially-oriented heat-shrinkable films that balance vertical and horizontal shrinkage may also be used as necessary for applications.

A person having ordinary skill in the art may adjust the heat shrinkage factor of the heat-shrinkable film as appropriate according to the application, but for example, a heat-shrinkable resin film produced by adjusting the heat shrinkage factor in the TD direction to 50% to 90% when the

film is uniaxially extended in the direction perpendicular to the flow of the film (TD direction) using a tenter method or the like and immersed in warm water at 90°C for 10 seconds may be used. Here, the heat shrinkage factor is a number obtained by the following formula.

Heat shrinkage ratio (%) = (dimensions before heating - dimensions after heating) / (dimensions before heating) × 100

[0014]

When applied to back printing, PET film, polystyrene-based resin film, hybrid film of PET and polystyrene-based resin, and the like are preferable because high transparency is obtained.

A person having ordinary skill in the art may select the thickness of the film constituting the substrate layer as appropriate depending on the packaging application and the like, but this is not particularly limited and is selected as appropriate within a range that does not impair heat resistance, rigidity, mechanical aptitude, appearance, and the like, with 5 to 90 μm being preferable, and 9 to 70 μm being desirable.

The film constituting the substrate layer above may have various additives such as lubricants, fillers, heat stabilizers, antioxidants, ultraviolet absorbers, antistatic agents, flame retardants, and colorants added as necessary. In addition, the surface of the film may be subjected to conventional surface treatment such as corona discharge treatment, plasma treatment, flame treatment, or acid treatment to improve printability.

[0015]

<3> Shielding layer

The shielding layer shields the color of the light shielding layer printed below and is composed of printing one or more white ink layers.

The thicker the white ink layer, the more effective the shielding effect is, and the brighter and less dull white is obtained, but due to problems such as reduced design freedom due to color limit in the printing process and rising costs, the thickness and number of layers of the shielding layer are limited. Therefore, a person having ordinary skill in the art may select a thickness of the shielding layer as appropriate selected by according to conditions such as the design of picture printing, but is, for example, 0.1 to 10 μm, preferably 0.2 to 5 μm. When the shielding layer is too thin, the color of the light shielding layer cannot be sufficiently concealed, and the whiteness decreases.

[0016]

As the white ink in the present invention, conventional white ink may be used, in which a white pigment is added to a binder resin for inks such as ordinary gravure ink or offset ink, any adjuvant or the like is added as necessary, and mixed with a solvent, diluent, or the like. Here, the white pigment is not particularly limited, and titanium oxide, calcium carbonate, magnesium carbonate, and mixtures composed of two or more of these may be used, but titanium oxide, which is the most common pigment, is preferably used for cost reasons and the like.

[0017]

In addition, a person having ordinary skill in the art may select a mass formulation ratio of the white pigment to the binder resin as appropriate according to a desired whiteness/luminosity, a thickness of a shielding layer, and the like, but for example, white pigment: binder resin = 4 to 5:1 to 0.8. In order to exhibit high white shielding, it is preferable to use a concave white ink.

By printing such a white ink on a substrate layer at the thickness described above, not only is the color of the light shielding layer blocked, but also blocking against ultraviolet rays is exhibited.

The shielding layer may be formed by a full surface solid or partial coat as necessary by a

conventional printing method such as gravure printing, offset printing, or silkscreen printing.
[0018]
<4> Light shielding layer

Due to reflecting light (ultraviolet light and visible light) that has passed through the substrate and the shielding layer from the outside, the light shielding layer is a layer prevents light from reaching the inside, and is a layer formed by printing a light shielding ink. The light shielding layer may be formed by printing on an entire surface solid or partial coat as necessary by a conventional printing method such as gravure printing, offset printing, or silkscreen printing, and even one layer may be formed by overlapping two or more layers.

In the present invention, the light shielding ink is made by adding aluminum particles to a binder resin used for ordinary gravure inks, offset inks, and the like, adding any adjuvant or the like as necessary, and kneading the ink with a solvent, diluent, or the like.
[0019]

The shape of the aluminum particles may be either spherical or flaked (flaky). In particular, those in the form of scales (flaky) are preferable because they line up on the entire surface of the ink film and gaps between particles are less likely to form. A person having ordinary skill in the art may select the size as appropriate, but for example, an average thickness (t) of 0.1 to 1.0 μm or even 0.1 to 0.2 μm may be used as appropriate.

Aluminum particles exhibit high whiteness and luster, and excellent light shielding properties are obtained by reflection. Furthermore, when the substrate layer is composed of a heat-shrinkable film, for example, when used as a shrink label packaging material, the light shielding layer composed of aluminum particles takes on a dense surface shape after heat shrinkage, and the gap between the particles becomes even smaller, and an even higher light shielding property can be exhibited. Therefore, the shrink label composed of the laminate of the present invention can exhibit sufficiently excellent light shielding properties after heat shrinkage, even when light shielding ink containing aluminum particles are printed in a thin layer, peeling does not readily occur between ink agglomerates due to rubbing and external impact, and this can be produced at a low cost.

When the aluminum particles are in a scale form, they may be either of a leafing type or a non-leafing type.
[0020]

In the laminate of the present invention, it is preferable to provide a light shielding layer such that transmittance is 10% or less and furthermore 3% or less over a region of visible light having a wavelength of 500 to 600 nm. In addition, when the substrate layer is a heat-shrinkable film, it is preferable to provide a light shielding layer so that the laminate after the desired heat shrinkage has transmittance within the above range.

Due to having visible light transmittance within the above range of 500 to 600 nm, it is possible to prevent the propagation of bacteria in the contents, for example, beverages such as yogurt, liquid seasonings, various liquid medicinal products, and chemicals, and to prevent discoloration, flavor deterioration, and the like over a long period of time, thereby significantly improving shelf life.
[0021]

A person having ordinary skill in the art may set a concentration of aluminum particles in the light shielding ink, a thickness of the light shielding layer, and the like as appropriate so that the light shielding layer exhibits a desired light shielding property.

Specifically, the concentration of aluminum particles can be determined in accordance with the heat shrinkage ratio of the substrate layer and the like in addition to the desired light shielding property and the layer thickness of the light shielding layer, but, for example, it is preferable that the

mass-combining ratio of aluminum particles to the binder resin is 2:2.5 to 3.5. The higher the concentration of aluminum particles, the more light shielding properties are obtained, but when the concentration is too high, the coating film forming properties are impaired, and a homogeneous ink film cannot be obtained. When the concentration of aluminum particles is low, visible light transmittance exceeds 10% and sufficient light shielding cannot be obtained.

Similarly, the thickness of the light shielding layer is, for example, 0.1 to 10 μm, preferably 0.2 to 5 μm. When the light shielding layer is too thin, visible light transmittance exceeds 10% and sufficient light shielding properties cannot be obtained. Conversely, when the light shielding layer is too thick, the cohesion force between molecules tends to be particularly weak, and thus the light shielding layer tends to detach due to rubbing and external impact, which is also disadvantageous in terms of cost.

[0022]

When the laminate of the present invention is applied to a shrink label, it is also possible to make the light shielding layer thinner, for example, 0.4 μm or less, or even 0.2 μm or less, in consideration that light shielding properties increase after heat shrinkage. Even when a thin light shielding layer is provided in this manner, the transmittance of visible light (380 to 780 nm, particularly a wavelength of 500 to 600 nm) after heat shrinkage can be set to one-half or less before heat shrinkage according to the shrinkage ratio.

[0023]

<5> Picture printing layer

When the substrate layer is composed of a resin film having transparency or translucency, a picture printing layer may be provided by back printing the printing ink between the substrate layer and the shielding layer. Back printing prevents pattern from falling off due to friction, scratching, and the like, and thus can be applied to a wide variety of packaging applications.

In addition, instead of or in addition to back printing, the white ink layer may be provided on the outer surface side (surface side) of the substrate layer as necessary, and then the picture printing layer may be provided by performing front printing. When a printing layer by surface printing is provided, it is preferable to provide a surface protective layer by coating an OP varnish or the like in order to protect the surface.

The pattern printing layer is formed by using a printing ink such as ordinary gravure ink, offset ink, letterpress ink, or silkscreen ink, and providing a layer of a decorative printing pattern composed of characters, symbols, figures, pictures, or the like by a printing method such as a gravure printing method, offset printing method, letterpress printing method, silkscreen printing method, or transfer printing method.

The thickness of the printed pattern layer is not particularly limited, but is preferably 1 to 10 μm, and is preferably 2 to 5 μm.

[0024]

<6> Slipperiness imparting layer

The slipperiness imparting layer is a layer provided when covering a packaging container as a shrink film to protect the light shielding layer by becoming the innermost surface of the laminate of the present invention and to improve slipperiness on the surface of the packaging container, and is made by printing ink on the light shielding layer.

In the present invention, the same conventional white ink as the shielding layer described above may be used as the ink that forms the slipperiness imparting layer. A person having ordinary skill in the art may select a mass combination ratio of the white pigment to the binder resin as appropriate, but more preferably, a type in which the composition ratio of the white pigment is less than the

shielding layer is preferably used, for example, a composition ratio of white pigment:binder resin = 2.5:1 to 3:0.8. By reducing the ratio of white pigments to a range where slipperiness is maintained, the amount of reflected light due to illumination from the slipperiness imparting layer is reduced, and the whiteness and brightness when observed from the front side (that is, the shielding layer side) can be further increased.

[0025]

The thickness of the slipperiness imparting layer is not particularly defined, but is, for example, 0.1 to 1 μm. When thinner than this, sufficient slipperiness cannot be imparted. Conversely, when thicker than this, the layer is more likely to detach due to rubbing and external impact.

The slipperiness imparting layer may be formed by a full surface solid or partial coat as necessary by a conventional printing method such as gravure printing, offset printing, or silkscreen printing.

[0026]

<7> Whiteness

In the laminate of the present invention, the light shielding layer exhibits a silver color, and thus a clear picture can be obtained without dulling the shielding layer composed of white ink and the picture printing layer. In particular, in a portion that is not provided with a picture printing layer on which the printing ink is printed, high whiteness and brightness are obtained, and it is also possible to set the brightness L* value of the L*a*b* surface color system measured from the outer surface side (surface side) to 82 or more, or even 88 or more.

A white film having a high L* value of this degree can provide a bright and clear picture printing layer, resulting in a packaging material that exhibits high designability. When the L* value is lower than 82, the appearance takes on a grayish color, and the decoration as a packaging label is impaired.

Note that in the present invention, the brightness L* value of the L*a*b* table color system is a value measured in accordance with JIS Z 8729.

[0027]

<8> Manufacturing method

In one aspect of the present invention, the laminate of the present invention may be produced by providing a shielding layer by printing one or more layers of white ink on one surface of the substrate layer such that the L* value of the laminate is 82 or more, and then providing a light shielding layer by printing the light shielding ink on the shielding layer so as to obtain the desired light shielding property.

Furthermore, as desired, after the light shielding layer is provided, the white ink may be printed on the light shielding layer to provide a slipperiness imparting layer. Furthermore, before providing the shielding layer, the printing ink may be back-printed on the substrate layer to provide a picture printing layer, and the shielding layer may be provided thereon. Alternatively, the printing ink may be printed on the other surface of the substrate layer to provide a picture printing layer, and in some cases, the OP varnish may be coated to provide a surface protection layer.

[0028]

<9> Packaging material

The laminate of the present invention may be used as a packaging material by itself or by laminating an intermediate layer and/or a heat seal layer on the side of a light shielding layer serving as an inner side.

In one aspect of the present invention, the laminate of the present invention, wherein the substrate layer is a heat-shrinkable film, is preferably used as a light shielding shrink label used to

cover the surface of a packaging container.

FIG. 6 is a schematic perspective view illustrating a cylindrical shrink label as one form of a light shielding shrink film composed of a laminate of the present invention. As illustrated in FIG. 6, the heat-shrinkable laminate of the present invention may be made configured as a (innermost layer) light shielding layer/shielding layer/substrate layer (outermost layer), and an upper end part 7a and an lower end part 7b, which are both end portions thereof, may be overlapped, and the overlapped portions may be bonded via thermal bonding or adhesive, or a seal portion may be formed by a solvent seal, forming a light shielding shrink label composed of a cylindrical body. Note that the light shielding shrink label may be in the form of a tube.

[0029]

Such a cylindrical shrink label, for example, can be supplied to an automatic label attaching device, cut to a required length, and then attached to the outer surface of the container body after filling and sealing, and then passed through a shrink tunnel or the like to cause hot air at a predetermined temperature (for example, about 80 to 200°C), steam heated by steam condensing water vapor and steam, or radiant heat such as infrared radiation to act, thereby causing the shrink label to contract highly in the circumferential direction of the container, coating the container body, and imparting light shielding properties to the coated portion.

Note that a perforation 8 may be applied, for example, by pressing a disc-like blade having cut portions and non-cut portions repeatedly formed around it. Furthermore, the perforation 8 may be applied at any appropriate stage among a step for manufacturing a shrink label 10 composed of a cylindrical body, that is, a shrink film cutting step, a tube application step, and a shrink label cutting step.

Examples of a mounted object (container) to be packaged by a light shielding shrink film 10 composed of a laminate of the present invention include a container such as a plastic container or a glass container. Examples of the resin constituting the plastic container include an olefin-based polymer such as polypropylene or a vinyl polymer such as a styrene-based polymer such as polystyrene, polyester, vinyl chloride resin, and the like. The resin may be a foam resin (for example, a Styrofoam resin).

[0030]

In another aspect of the present invention, as illustrated in FIG. 4 or FIG. 5, an intermediate layer and/or a heat seal layer may be laminated on the side of the light shielding layer of the laminate of the present invention to be suitably used as a packaging material for packaging bags, lids, and the like.

Examples of intermediate layers include various gas barrier films and reinforcing films. Examples of gas barrier films include vapor deposited films of inorganic oxides and metals, gas barrier resin films such as saponified ethylene-vinyl acetate copolymers, nylon MXD6, and polyacrylonitrile (PAN), and metal films such as aluminum foil. Examples of reinforcing films include biaxially oriented nylon films and polyamide-based resin films in order to improve the toughness, bending, and puncture resistance of the laminate. The film forming the intermediate layer may be laminated with the surface of the light shielding layer side of the laminate of the present invention by any method, for example, using an adhesive for dry lamination. If necessary, various surface treatments for increasing the interlayer adhesion strength may be applied to the laminated surface of the film.

[0031]

The heat seal layer may be a layer composed of any resin that can be melted by heat and bonded to each other. For example, a film or sheet composed of one or more polyolefin-based

resins, such as low-density polyethylene, medium-density polyethylene, high-density polyethylene, linear (linear) low-density polyethylene, polypropylene, ethylene-vinyl acetate copolymer, ionomer resin, and polyolefin-based resin modified with unsaturated carboxylic acid, may be used, and corona treatment, frame treatment, ozone treatment, or the like may be applied to the surface thereof as desired. The thickness of the heat seal layer is not particularly limited, but is preferably 5 to 500 μm, more preferably 10 to 250 μm.

When the film or sheet described above is laminated, this can be performed by a conventional dry lamination method or an extrusion lamination method via an anchor coat agent.

[0032]

The packaging material provided with the heat seal layer in the laminate of the present invention may be used as various packaging containers, packaging bags, lid materials, and the like that require light shielding properties, high design properties, and decorative properties.

That is, two packaging materials of the present invention may be prepared, or the packaging material may be folded in half, the surfaces of the heat seal layers facing each other and overlapped, and the ends thereof heat sealed to produce a packaging bag. The packaging body can be produced by filling the contents and sealing the top part.

The packaging material composed of the laminate of the present invention has excellent light shielding properties and, in particular, excellent light shielding properties against visible light having a wavelength of 500 to 600 nm, and is therefore suitable for packaging beverages, such as juice, cola, water, tea, milk and milk beverages, yogurt, alcoholic beverages, such as beer, whiskey, brandy, rum, red wine, and various cocktails, liquid seasonings, such as soy sauce, various sauces, tempura sauces, various sauces, broths, dressings, mayonnaise, and the like, fats and oils, cosmetics, such as lotions, emulsions, lotions, and lotions, and liquid chemicals, and the like, as well as toiletry products, such as shampoos and rinses.

[0033]

In particular, by configuring the shrink label of the present invention in a full shrink form that is attached to the entire container such as a plastic bottle or a glass bottle, a packaging product that has excellent light shielding properties in the visible light and ultraviolet light regions and has excellent design properties can be obtained by using a packaging body in which a container covered by the shrink label is filled with content that requires particular light shielding properties such as milk and dairy products.

Next, the present invention will be specifically described with reference to examples.

[Examples]

[0034]

(Example 1)

(Production of reflective light shielding laminate)

As a light shielding ink, a non-leafing type aluminum paste (TFG light shielding silver made by Dainichiseika Chemicals & Color Mfg. Co., Ltd., flaked aluminum particles, average particle size of 7 μm and average thickness of 0.2 μm, aluminum particle content of about 10% by mass) and various additives were added to a binder resin composed of urethane resin, vinyl chloride copolymer, and cellulose resin, and a solvent was used to prepare a kneaded silver ink. Note that in the Specification of the present application, the average particle size is a value obtained by dynamic light scattering type particle size distribution measurement. The composition of the silver ink was 10% by mass of aluminum paste, 15% by mass of binder resin, 19% by mass of additives, and solvents (ethyl acetate, 19% by mass of methyl ethyl ketone, and 11% by mass of isopropyl alcohol).

In addition, a white ink (OS-MS-HC outer white made by Dainichiseika Chemicals & Color Mfg. Co., Ltd.) was prepared by adding titanium dioxide pigments and various additives to a binder resin composed of urethane resin and acrylic resin and kneading the white ink to form a shielding layer using a solvent.

Furthermore, as a printing ink for forming a picture printing layer, organic or inorganic pigments and various additives were added to a binder resin composed of urethane resin and cellulose resin, and a color ink was prepared by kneading using a solvent.

[0035]

Meanwhile, a 30 μm thick PET film for shrinkage in which an antistatic coat treatment was applied on one side (RX-21S made by Mitsubishi Plastics, Inc., vertically uniaxially stretched, heat shrinkage ratio 62% at 90°C 10 seconds) was prepared, and the above printing ink was back printed by the gravure printing method on this untreated surface to provide a picture printing layer.

Next, white ink was printed on the pattern printing layer by a gravure printing method to provide a shielding layer having a thickness of 2 μm.

Next, the silver ink was printed on the shielding layer by a gravure printing method to provide a light shielding layer 0.3 μm thick to produce the reflective light shielding laminate of the present invention.

[0036]

(Production of shrink label)

The above white ink was further printed on a shielding layer of the light shielding laminate obtained above by a gravure printing method to provide a layer imparting slipperiness of 0.5 μm in thickness to produce a light shielding shrink film.

This light shielding shrink film was cut into a product label (160 mm width), a sewing machine for opening the film (0.4 mm perforating blade length, 1.6 mm perforation interval) was inserted at the same time, both end portions were overlapped so as to form a cylinder with the slipperiness imparting layer inside, a mixed solvent (50% by volume of dioxofuran, 50% by volume of methyl ethyl ketone) was applied to the overlap portions, and the substrate layer (PET film for shrink) was dissolved to form a cylindrical shrink label. The location corresponding to the superimposition part is not provided with various printing layers.

[0037]

(Covering of bottle)

The cylindrical shrink label obtained above was supplied to an automatic label mounting device and cut to the required length. Next, the contents (yoghurt beverage) were loaded into a PET bottle and sealed, the cylindrical shrink label described above was adhered to the outer surface of this PET bottle, and the shrink label was applied from the lower end of the mouth to the bottom of the PET bottle through a shrink tunnel heated at 90°C for 10 seconds by a steam heater.

[0038]

(Example 2)

(Production of reflective light shielding laminate)

As a light shielding ink, a non-leafing type aluminum paste (TFG light shielding silver made by Dainichiseika Chemicals & Color Mfg. Co., Ltd., flaked aluminum particles, average particle size of 7 μm and average thickness of 0.2 μm, aluminum particle content of about 10% by mass) and various additives were added to a binder resin composed of urethane resin, and a silver ink kneaded using a solvent was prepared. The composition of the silver ink was 10% by mass of aluminum paste, 15% by mass of binder resin, 19% by mass of additives, and solvents (ethyl acetate, 19% by mass of methyl ethyl ketone, and 11% by mass of isopropyl alcohol).

[0039]

In addition, a white ink (OS-MS-HC surface white made by Dainichiseika Chemicals & Color Mfg. Co., Ltd.) was prepared by adding titanium dioxide pigments and various additives to a binder resin composed of urethane resin and kneading the white ink to form a shielding layer using a solvent.

Furthermore, as a printing ink for forming a picture printing layer, organic or inorganic pigments and various additives were added to a binder resin composed of urethane resin, and a color ink was prepared by kneading using a solvent.

On the other hand, a 12 μm thick PET film (Toyobo E5100 film made by Toyobo Co., Ltd.) having been corona-treated on one side was prepared, and the above printing ink was back-printed by the gravure printing method on this corona-treated surface to provide a picture printing layer.

Next, white ink was printed on the pattern printing layer by a gravure printing method to provide a shielding layer having a thickness of 2 μm.

Next, silver ink was printed on the shielding layer by a gravure printing method, and a light shielding layer having a thickness of 0.3 μm was provided to produce the reflective light shielding laminate of the present invention.

[0040]

(Production of packaging material)

An adhesive layer was provided by applying a two-part curing polyurethane-based adhesive on a shielding layer of the reflective light shielding laminate obtained above so as to have a dry thickness of 3 μm, and an intermediate layer was provided on top of this by laminating a biaxially oriented nylon film having a thickness of 15 μm having been corona-treated on both sides by the dry lamination method to reinforce impact resistance and puncture resistance.

Next, an adhesive layer was provided by applying a two-part curing polyurethane-based adhesive on the intermediate layer so as to be 3 μm thick when dried, and a heat seal layer was provided by laminating an unstretched polypropylene film having a thickness of 60 μm on top thereof by a dry lamination method to produce a light shielding packaging material.

Two of the packaging materials cut into 160 mm widths were prepared, the surfaces of the heat seal layers were overlapped facing each other, and the ends of the outer peripheral portions thereof were heat sealed on three sides to form a seal portion, producing a packaging bag of the three-way seal type.

[0041]

(Comparative Example 1)

A light shielding laminate was produced in the same manner as in example 1, except that, instead of a silver ink containing aluminum paste, a gray ink containing a gray pigment (a mixed pigment composed of titanium dioxide and carbon black) that had been conventionally used as a light shielding ink was used as the light shielding ink.

[0042]

(Comparative Example 2)

A light shielding laminate was produced in the same manner as in example 2, except that, instead of silver ink containing aluminum paste, gray ink containing a gray pigment (mixed pigment composed of titanium dioxide and carbon black) conventionally used as a light shielding ink was used as the light shielding ink.

[0043]

(Light shielding evaluation test)

For the light shielding laminates of examples 1 and 2 and comparative examples 1 and 2,

light transmittance at wavelengths of 500 nm and 600 nm was measured. Light transmittance was measured using UV-2400PC (made by Shimadzu Corporation) in accordance with JIS-K7105.

For the light shielding laminate of example 1 and comparative example 1, light transmittance in the range of 300 to 800 nm was also measured for the test specimens before and after heat shrinkage by 10%.

The measurement results are shown in Table 1 and FIG. 7.

[0044]

(Whiteness evaluation test)

For the white areas in which the printing ink of the light shielding laminate of examples 1 and 2 and comparative examples 1 and 2 was not provided, the L* value defined by the L*a*b* surface color system was measured using a chromatic difference in accordance with JIS-K8729.

The measurement results are shown in Table 1.

[0045]

[Table 1]

Table 1. Light transmittance measurement results

	Light transmittance [%]				L* value
	Before shrinkage		After shrinkage		
	500[nm]	600[nm]	500[nm]	600[nm]	
Example 1	3.65	4.34	1.91	2.26	88.51
Example 2	3.70	4.41	—	—	88.49
Comparative Example 1	9.90	12.58	6.01	8.21	81.82
Comparative Example 2	10.06	12.84	—	—	81.75

[0046]

(Evaluation results)

As shown in Table 1, the light shielding laminates of examples 1 and 2 exhibited light shielding properties equivalent to or higher than those of comparative examples 1 and 2 using conventional light shielding inks with a wavelength of 500 to 600 nm, but exhibited a higher whiteness than these. Therefore, the pattern of the light shielding laminate according to the present invention was clear without dullness and had excellent design. In comparison, the pattern of the light shielding laminate of comparative examples 1 and 2 was dull and gave a dark impression.

In addition, the light shielding laminate of example 1 excellent light shielding properties after heat shrinkage despite providing a thin light shielding layer.

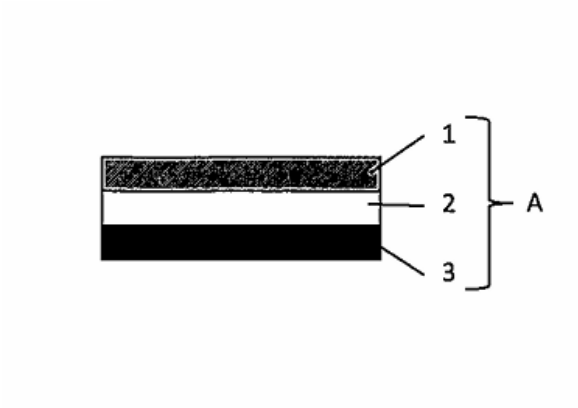
[Description of Reference Numerals]

[0047]

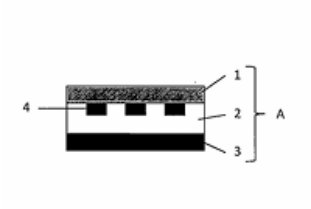
1. Substrate layer
2. Shielding layer (white ink)
3. Light shielding layer
4, 6. Image printing layer
5. White ink layer
7b. Lower end part
8a. Cut part
8b. Non-cut part
8. Perforation

10. Light shielding shrink label composed of cylindrical body
11. Bonded seal part
A. Reflective light shielding laminate
B. Heat seal layer
C. Intermediate layer

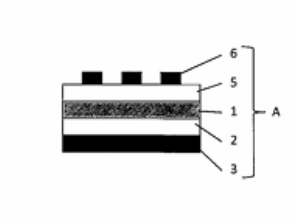
[FIG. 1]



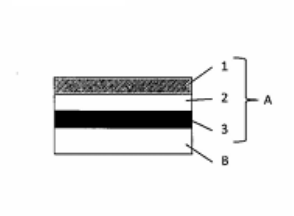
[FIG. 2]



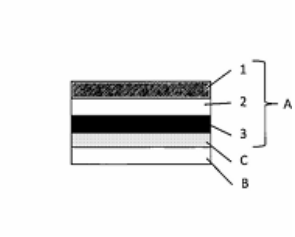
[FIG. 3]



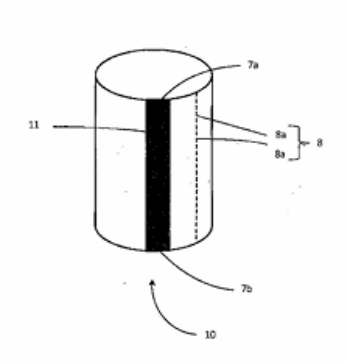
[FIG. 4]



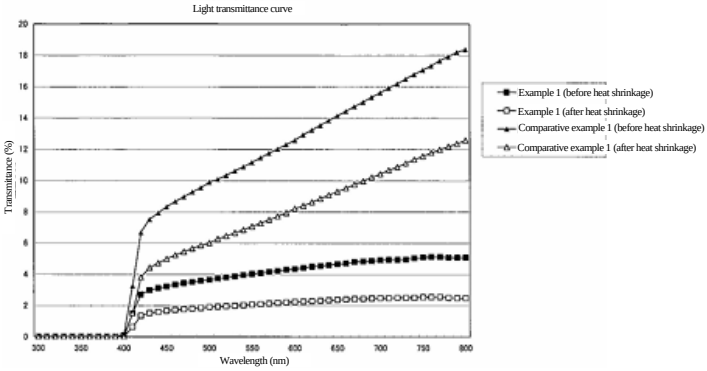
[FIG. 5]



[FIG. 6]



[FIG. 7]



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F-Term (Reference) 3E067 AA03 AB01 AB21 AB26 AB28 AB81 AB99 BA12A BA14A BB11A
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3E086 AA22 AA23 AB01 AC07 AD01 AD16 AD24 BA04 BA13 BA15
BA35 BB01 BB22 BB51 BB67 CA01 CA11 CA12 CA13 CA28
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4F100 AA21C AB10D AK01C AK01D AK42A AT00A BA03 BA04 BA05 BA07
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JL12E JN02C JN02D YY00D