

PACKAGING MATERIAL AND CONTAINER

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to packaging materials and containers.

Description of the Related Art

Easy open packaging materials having easy peelability are sorted roughly into interfacial peeling type, interlaminar peeling type and cohesive peeling type, depending on their difference in the peeling mechanism. Among these types, a peel layer made of materials of the cohesive peeling type undergoes internal cohesive failure upon unsealing, thus exhibiting easy peelability. As materials of the cohesive peeling type, EVA-based materials blended with wax or a tackifier, and immiscible polymer alloys of polyolefin/polystyrene type or polyethylene/polypropylene type, are known and characterized by being excellent in the sealing temperature stability of peel strength, smear sealability, and resistance to contents. The phrase "excellent in smear sealability" means that the heat-sealing material, even if contaminated with impurities having a relatively large particle size, shows good heat seal performance.

However, the conventional easy open packaging material of the cohesive failure type has the problem of an easily

occurring "feathering phenomenon" where a peel layer resin remains in the form of fibers on a peeled face upon unsealing. Further, the peel strength is difficult to control, so that when a polyethylene-coated paper is used as an adherend, the peel strength is too strong thus causing another problem of an easily occurring "paper peel phenomenon" where the paper forming a surface of the adherend is destroyed.

In addition, when the conventional easy open material is laminated by extrusion-lamination onto a substrate such as paper, film or metal foil, the resulting easy open packaging material is easily curled thus bringing about another problem of troubles in supply and handling thereof as a lid material during heat-sealing onto a container.

SUMMARY OF THE INVENTION

Under these circumstances, an object of the present invention is to provide packaging materials and containers which are readily unsealable with less curling and with no feathering upon unsealing in the field of sealed containers to be unsealed by peeling heat-sealed portions.

The easy open packaging material according to the present invention comprises a substrate and a heat seal layer disposed on one side of the substrate, wherein the heat seal layer has a laminated structure provided with (B) a resin layer comprising an ethylene-unsaturated carboxylic acid copolymer and (A) a resin layer comprising 55 to 75 parts by weight of low-density

polyethylene and 45 to 25 parts by weight of polybutene-1 in this order from the side of the substrate, and the resin layers (A) and (B) are mutually laminated by co-extrusion.

The easy open container according to the present invention is characterized in that such a packaging material is heat-sealed as a lid material of a paper cup container having an innermost layer comprising polyethylene having a melting point of 105 to 115 °C, and upon unsealing, the resin layer (A) undergoes cohesive failure.

Preferably, the thickness of the resin layer (A) is in the range of 5 to 15 μm , and the thickness of the resin layer (B) is equal to or more than the thickness of the resin layer (A).

Preferably, the low-density polyethylene is high-pressure processed low-density polyethylene having a melting point of 110 °C or less, the polybutene-1 is a homopolymer having a melting point of 120 °C or more, and the melting point of the ethylene-unsaturated carboxylic acid copolymer is lower than the melting point of the low-density polyethylene.

Preferably, the heat seal layer is laminated on the substrate by co-extrusion lamination.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a schematic sectional view showing one example of a layer constitution of a packaging material of the present invention.

Fig. 2 is a schematic sectional view showing another example of the layer constitution of the packaging material of the present invention.

Figs. 3(a) and 3(b) are conceptual views for explaining the state of the packaging material of the present invention upon being peeled from an adherend, where Fig. 3(a) shows a heat-sealed state, and Fig. 3(b) shows a state where the heat-sealed portion was peeled.

Figs. 4(a) to 4(d) show an example of a container using the packaging material of the present invention as a lid material, where Fig. 4(a) is a perspective view of the container, Fig. 4(b) is a sectional view taken along the X-X section, Fig. 4(c) is a partial sectional view of a sealed portion, and Fig. 4(d) is a partial sectional view of the peeled portion upon peeling of the lid material.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Fig. 1 is a schematic sectional view showing one example of a layer constitution of a packaging material of the present invention. Fig. 2 is a schematic sectional view showing another example of the layer constitution of the packaging material of the present invention. Figs. 3(a) and 3(b) are conceptual views for explaining the state of the packaging material of the present invention upon being peeled from an adherend, where Fig. 3(a) shows a heat-sealed state, and Fig. 3(b) shows a state where the heat-sealed portion was peeled. Figs. 4(a) to 4(d)

show an example of a container using the packaging material of the present invention as a lid material, where Fig. 4(a) is a perspective view of the container, Fig. 4(b) is a sectional view taken along the X-X section, Fig. 4(c) is a partial sectional view of a sealed portion, and Fig. 4(d) is a partial sectional view of the peeled portion upon peeling of the lid material.

As shown in Figs. 1 and 2, a packaging material 1 of the present invention is composed of at least a substrate layer 3 and a heat seal layer 2, wherein the heat seal layer 2 is composed of at least two layers (2A and 2B) formed by laminating resins different from each other. In the example of Fig. 1, a heat seal layer in a film form is directly formed onto a substrate such as paper by extrusion-coating, and in the example of Fig. 2, a film to be used as the heat seal layer 2 is previously formed and then bonded via an adhesive 4 to a substrate such as plastic film by dry lamination.

As the substrate, a paper, a metal foil and a plastic film can be used singly or as a laminate thereof. The plastic film may be a deposited film deposited with a thin film layer of an oxide such as silica or alumina, or a metal such as aluminum.

In the heat seal layer 2 in the packaging material of the present invention as shown in Fig. 1, the resin layer 2A made of a mixture containing 55 to 75 parts by weight of low-density polyethylene and 45 to 25 parts by weight of polybutene-1 is laminated on the resin layer 2B made of a resin containing an ethylene-unsaturated carboxylic acid copolymer as a main component by co-extrusion via no adhesive layer. In the

lamine with the substrate 3, a resin layer 2B of an ethylene-unsaturated carboxylic acid copolymer in the heat seal layer 2 is arranged at the side of the substrate. In other words, the heat seal layer 2 is laminated so as to face the resin layer 2B to the substrate.

The layer 2A comprising a mixture of low-density polyethylene and polybutene-1 forms a peel layer which can cause cohesive failure upon unsealing. Polybutene-1 is substantially immiscible with low-density polyethylene, and a mixture of these materials forms the so-called "islet structure". Thus the cohesive power of the peel layer is lowered to attain easy peelability of the cohesive failure type. When the blending ratio of polybutene-1 is less than 25 % by weight, the peel strength is so strong that paper peeling occurs when a polyethylene-coated paper is used as an adherend. When the blending ratio of polybutene-1 exceeds 45 % by weight, the peel strength becomes insufficient to cause feathering easily.

EMAA (ethylene-methacrylic acid copolymer), or EAA (ethylene-acrylic acid copolymer) can be used as the ethylene-unsaturated carboxylic acid copolymer. By arranging the resin layer 2B of the ethylene-unsaturated carboxylic acid copolymer adjacent to the resin layer 2A as the peel layer, the cohesive failure of the peel layer upon unsealing can be directed in the vicinity of the border between the 2A and 2B layers, the peel strength is stabilized, and feathering can be suppressed. By providing the ethylene-unsaturated carboxylic acid copolymer layer, there is brought about the effect of

suppressing curling upon lamination of the heat seal layer on the substrate.

By laminating the 2A and 2B layers at a predetermined thickness ratio, the heat seal layer can be formed easily. The method of laminating the heat seal layer 2 having the 2A and 2B layers onto the substrate 3 can make use of dry lamination, sandwich lamination, co-extrusion lamination etc.

If the thickness of the 2A layer in the heat seal layer is less than 5 μm , the seal strength is liable to become unstable, and the smear sealability is also liable to become insufficient. Further, when the thickness of the 2A layer in the heat seal layer is more than 5 μm , feathering easily occurs upon unsealing. On the other hand, if the 2B layer forming the heat seal layer is thinner than the 2A layer, curling may become significant upon lamination of the heat seal layer on the substrate, and further the laminating process of the 2A and 2B layers by co-extrusion may become difficult.

If the melting point of the low-density polyethylene contained in the 2A layer in the heat seal layer is higher than 110 °C, the heat-seal strength at low temperatures is liable to be lowered, and feathering also easily occurs. When linear low-density polyethylene (LLDPE), that is, an ethylene- α -olefin copolymer is used in the 2A layer, the seal strength becomes high to cause paper peeling easily. The low-density polyethylene used in the 2A layer in the heat seal layer is preferably high-pressure processed low-density polyethylene with a density of 0.915 to 0.920 and an MFR of 0.5 to 50,

preferably 20 to 50.

If the melting point of polybutene-1 is less than 120 °C, the seal strength becomes high to cause paper peeling easily upon peeling. When a butene-1-based copolymer prepared by copolymerizing the butene-1 with another olefin is utilized, the seal strength becomes high to cause paper peeling easily. Polybutene-1 is preferably the one having a density ranging from 0.905 to 0.917 and an MFR ranging from 0.2 to 20. —

EMAA or EAA can be preferably used as the ethylene-unsaturated carboxylic acid copolymer in the 2B layer in the heat seal layer. If the melting point of the ethylene-unsaturated carboxylic acid copolymer is higher than that of low-density polyethylene used in the 2A layer, feathering easily occurs upon unsealing. EMAA having a density of 0.930 to 0.940 and an MFR of 2 to 20 can be preferably used. EAA having a density of 0.924 to 0.941 and an MFR of 2 to 20 can be preferably used.

Hereinafter, the unsealing of a container using the packaging material of the present invention is described. As shown in Fig. 3(a), the heat seal layer of the packaging material 1 of the present invention is arranged opposite the heat seal layer of the adherend 10 and then heat-sealed with a heating plate 30, to form the heat-sealed portion 13. When a heat-sealed portion 13 is peeled in order to unseal, as shown in Fig. 3(b), cohesive failure 14 occurs in the 2A layer made of the blend resin in the heat seal layer 2, to exhibit an easy unsealing and form a feathering-free peeled face.

If the substrate 3 on which the heat seal layer 2 is laminated is a paper, an aluminum foil or a plastic film such as polyethylene, the heat seal layer 2 composed of the 2A and 2B layers can be laminated directly on the substrate by co-extrusion lamination, thus simplifying the production process.

As shown in Fig. 4(a), the packaging material of the present invention can be used preferably as the lid material 21 to be heat-sealed onto a polyethylene-coated paper cup container 22. A plain flange 23 of the paper container is formed by pressing a lip-curved portion of the container body 22, and then the lid 21 is heat-sealed onto the flange portion at which the innermost layer of the polyethylene, thereby sealing the container. To unseal the container, the heat-sealed portion of the lid is peeled. Fig. 4(d) shows the packaging material of the present invention used as a lid material, which is peeled for unsealing. The paper container described above is used widely for foods such as instant noodles, yogurt, snacks, natto (fermented soybeans) etc. By using the packaging material of the present invention as a lid material for the paper container, the container can be endowed with easy unsealability excellent in peeling, while feathering occurring on a peeled face of a conventional paper container can be eliminated.

As mentioned above, the packaging material of the present invention has a heat seal layer containing a peel layer. A heat-sealed portion formed using this packaging material in a heat-sealing system, upon peeling for unsealing, undergoes cohesive failure in the peel layer to show easy unsealability.

In addition, no feathering is generated on the unsealed portion.

If this packaging material is used as a lid material for a paper cup having an internal face composed of polyethylene, an easily unsealable, sealed paper cup can be obtained. The container thus obtained is of high usability for the consumer.

EXAMPLES

Hereinafter, the packaging materials and containers of the present invention are described in more detail by reference to the Examples, which however are not intended to limit the present invention.

(Example 1)

A mixture of 65 parts by weight of low-density polyethylene (melting point, 105 °C) and 35 parts by weight of polybutene-1 (melting point, 125 °C) which was used as a first layer (thickness, 10 μm) as a peel layer, and an ethylene-methacrylic acid copolymer (referred to hereinafter as "EMAA") (melting point, 98 °C) as a second layer (thickness, 20 μm), were treated with ozone at the side of the EMAA layer and simultaneously co-extrusion-laminated at an extrusion temperature of 300 °C onto a paper (100 g/m²) previously subjected to corona treatment, to give a packaging material having the following constitution:

Paper (100 g/m²)/EMAA (20 μm)/peel layer (10 μm).

(Example 2)

A mixture of 65 parts by weight of low-density polyethylene (melting point, 105 °C) and 35 parts by weight of polybutene-1 (melting point, 125 °C) which was used as a first layer (thickness, 10 μ m) as a peel layer, and EMAA (melting point, 98 °C) as a second layer (thickness, 20 μ m), were co-extrusion-laminated at an extrusion temperature of 300 °C onto an aluminum foil (thickness, 50 μ m), to give a packaging material having the following constitution: —

Aluminum foil (50 μ m)/EMAA (20 μ m)/peel layer (10 μ m).

(Example 3)

The same procedure as in Example 1 was conducted except that an ethylene-acrylic acid copolymer (referred to hereinafter as "EAA") (melting point, 96 °C) was used in place of EMAA. That is, a mixture of 65 parts by weight of low-density polyethylene (melting point, 105 °C) and 35 parts by weight of polybutene-1 (melting point, 125 °C) which was used as a first layer (thickness, 10 μ m) as a peel layer, and EAA (melting point, 96 °C) as a second layer (thickness, 20 μ m), were treated with ozone at the side of the EAA layer and simultaneously co-extrusion-laminated at an extrusion temperature of 300 °C onto a paper (100 g/m²) previously subjected to corona treatment, to give a packaging material having the following constitution:

Paper (100 g/m²)/EAA (20 μ m)/peel layer (10 μ m).

(Example 4)

A mixture of 65 parts by weight of low-density

polyethylene (melting point, 105 °C) and 35 parts by weight of polybutene-1 (melting point, 125 °C) which was used as a first layer as a peel layer, and EMAA (melting point, 98 °C) as a second layer, were formed into a sealant film by multi-layer inflation molding method. The film was treated with corona at the side of the EMAA layer and then dry-laminated via a two-component curing urethane adhesive onto one side of a PET film of 16 μm in thickness, to give a packaging material having the following constitution:

PET (16 μm)/adhesive layer/EMAA (20 μm)/peel layer (10 μm).

(Example 5)

A mixture of 65 parts by weight of low-density polyethylene (melting point, 105 °C) and 35 parts by weight of polybutene-1 (melting point, 125 °C) which was used as a first layer (thickness, 20 μm) as a peel layer, and EMAA (melting point, 98 °C) as a second layer (thickness, 10 μm), were treated with ozone at the side of the EMAA layer and simultaneously co-extrusion-laminated at an extrusion temperature of 300 °C onto a paper (100 g/m²) previously subjected to corona treatment, to give a packaging material having the following constitution:

Paper (100 g/m²)/EMAA (20 μm)/peel layer (10 μm).

(Example 6)

A mixture of 65 parts by weight of low-density polyethylene (melting point, 111 °C) and 35 parts by weight of

polybutene-1 (melting point, 125 °C) which was used as a first layer (thickness, 10 μm) as a peel layer, and EMAA (melting point, 98 °C) as a second layer (thickness, 20 μm), were treated with ozone at the side of the EMAA layer and simultaneously co-extrusion-laminated at an extrusion temperature of 300 °C onto a paper (100 g/m²) previously subjected to corona treatment, to give a packaging material having the following constitution:

Paper (100 g/m²)/EMAA (20 μm)/peel layer (10 μm).

(Example 7)

A mixture of 65 parts by weight of low-density polyethylene (melting point, 105 °C) and 35 parts by weight of polybutene-1 (melting point, 100 °C) which was used as a first layer (thickness, 10 μm) as a peel layer, and EMAA (melting point, 98 °C) as a second layer (thickness, 20 μm), were treated with ozone at the side of the EMAA layer and simultaneously co-extrusion-laminated at an extrusion temperature of 300 °C onto a paper (100 g/m²) previously subjected to corona treatment, to give a packaging material having the following constitution:

Paper (100 g/m²)/EMAA (20 μm)/peel layer (10 μm).

(Example 8)

A mixture of 65 parts by weight of low-density polyethylene (melting point, 105 °C) and 35 parts by weight of polybutene-1 (melting point, 125 °C) which was used as a first layer (thickness, 10 μm) as a peel layer, and EMAA (melting point, 105 °C) as a second layer (thickness, 20 μm), were treated with

ozone at the side of the EMAA layer and simultaneously co-extrusion-laminated at an extrusion temperature of 300 °C onto a paper (100 g/m²) previously subjected to corona treatment, to give a packaging material having the following constitution:

Paper (100 g/m²)/EMAA (20 µm)/peel layer (10 µm).

(Comparative Example 1)

A mixture of 80 parts by weight of low-density polyethylene (melting point, 105 °C) and 20 parts by weight of polybutene-1 (melting point, 125 °C) which was used as a first layer (thickness, 10 µm) as a peel layer, and EMAA (melting point, 98 °C) as a second layer (thickness, 20 µm), were treated with ozone at the side of the EMAA layer and simultaneously co-extrusion-laminated at an extrusion temperature of 300 °C onto a paper (100 g/m²) previously subjected to corona treatment, to give a packaging material having the following constitution:

Paper (100 g/m²)/EMAA (20 µm)/peel layer (10 µm).

(Comparative Example 2)

A mixture of 50 parts by weight of low-density polyethylene (melting point, 105 °C) and 50 parts by weight of polybutene-1 (melting point, 125 °C) which was used as a first layer (thickness, 10 µm) as a peel layer, and EMAA (melting point, 98 °C) as a second layer (thickness, 20 µm), were treated with ozone at the side of the EMAA layer and simultaneously co-extrusion-laminated at an extrusion temperature of 300 °C onto a paper (100 g/m²) previously subjected to corona treatment,

to give a packaging material having the following constitution:

Paper (100 g/m²)/EMAA (20 μm)/peel layer (10 μm).

(Comparative Example 3)

A mixture of 65 parts by weight of low-density polyethylene (melting point, 105 °C) and 35 parts by weight of polybutene-1 (melting point, 125 °C) which was used as a first layer (thickness, 10 μm) as a peel layer, and low-density polyethylene (LDPE) (melting point of 105 °C, density = 0.92, MFR = 7) as a second layer (thickness, 20 μm), were treated with ozone at the side of the LDPE layer and simultaneously co-extrusion-laminated at an extrusion temperature of 300 °C onto a paper (100 g/m²) previously subjected to corona treatment, to give a packaging material having the following constitution:

Paper (100 g/m²)/LDPE (20 μm)/peel layer (10 μm).

(Comparative Example 4)

A mixture of 65 parts by weight of linear low-density polyethylene (referred to hereinafter as "LLDPE") (melting point, 110 °C) and 35 parts by weight of polybutene-1 (melting point, 125 °C) which was used as a first layer (thickness, 10 μm) as a peel layer, and EMAA (melting point, 98 °C) as a second layer (thickness, 20 μm), were treated with ozone at the side of the EMAA layer and simultaneously co-extrusion-laminated at an extrusion temperature of 300 °C onto a paper (100 g/m²) previously subjected to corona treatment, to give a packaging material having the following constitution:

Paper (100 g/m²)/EMAA (20 μm)/peel layer (10 μm).

<Test>

A raw paper (280 g/m²) for a cup which was extrusion-coated with 20 μm thickness low-density polyethylene having a melting point of 106 °C was formed into a cup having a flange portion, and as a lid material, the packaging material formed in Example 1 was heat-sealed onto the flange under the conditions of 150 °C and 0.6 sec. Then, the cup was unsealed, and the surface of the peeled portion was observed under a microscope. Because a peel layer of the lid material was observed both on the lid material and on the cup, it was confirmed that the peel layer underwent cohesive failure upon unsealing.

Further, each of the packaging materials prepared in the Examples and Comparative Examples was heat-sealed under the conditions of 140 °C, 98 Kpa, and 1 sec., onto a raw paper (280 g/m²) for a cup which was extrusion-coated with low-density polyethylene (thickness, 20 μm) having a melting point of 106 °C. These packaging materials were compared by examining peel strength and feathering on each peeled surface. Curling was evaluated by observation with eyes.

The easy unsealability and curling of each of the packaging materials in the Examples and Comparative Examples are as follows:

TABLE 1

	Peel strength (N/15mm)	Feathering on peeled face	Curling
Examples			
1	5.5	None	Small
2	5.0	None	Small
3	5.5	None	Small
4	6.5	None	Small
5	4.5	A little conspicuous	Middle
6	4.0	A little conspicuous	Small
7	7.0	None	Small
8	3.0	A little conspicuous	Middle
Comparative examples			
1	Paper peeling	—	Small
2	2.5	A little conspicuous	Small
3	5.0	Conspicuous	Large
4	Paper peeling	—	Small

The packaging materials in Examples 1 to 4 showed suitable peel strength and little curling without causing feathering on the peeled surface. In the packaging material in Example 5, the EMAA layer was slightly thinner than the peel layer, so curling was a little noticeable, and feathering was a little conspicuous. In the packaging material in Example 6, the melting point of low-density polyethylene was slightly high, so the peel strength was slightly low, and feathering was a little conspicuous. In the packaging material in Example 7, the melting point of polybutene-1 was slightly low, so the peel strength was a little high. In the packaging material in Example 8, the melting point of EMAA was slightly high which was the same as the melting point of low-density polyethylene, so feathering was a little conspicuous, the peel strength was a little low, and curling was a little remarkable.

In the packaging material in Comparative Example 1, the blend ratio of polybutene-1 was so low that the peeling strength was large, and paper peeling occurred. In the packaging material in Comparative Example 2, the blend ratio of polybutene-1 was too high, so the peel strength was too low and the feathering was a little conspicuous. In the packaging material in Comparative Example 3, low-density polyethylene was used as the second layer in place of the ethylene-unsaturated carboxylic acid copolymer, so feathering was conspicuous and curling was significant. In the packaging material in Comparative Example 4, LLDPE was used in place of low-density polyethylene in the first layer, so the peel strength was too high and paper peeling occurred.

(Example 9)

A mixture of 60 parts by weight of low-density polyethylene (melting point, 106 °C) and 40 parts by weight of polybutene-1 (melting point, 125 °C) which was used as a first layer (thickness, 10 μ m) as a peel layer, and EMAA (melting point, 100 °C) as a second layer (thickness, 30 μ m), were treated with ozone at the side of the EMAA layer and simultaneously co-extrusion-laminated at an extrusion temperature of 260 °C via an urethane anchoring agent onto the aluminum foil side of a substrate having the layer constitution of (paper/polyethylene/aluminum foil), to give a packaging material having the following constitution:

Paper (79 g/m²)/polyethylene (20 μ m)/aluminum foil (7

μm)/EMAA (30 μm)/peel layer (10 μm).

When this packaging material was used as a lid material for a paper cup for instant noodles, which was formed from a paper (280 g/m²) coated inside with polyethylene having a melting point of 110 °C, neither paper peel nor feathering occurred upon unsealing. An easy open container excellent in sealing properties and heat resistance could thus be obtained.

(Example 10)

A mixture of 70 parts by weight of low-density polyethylene (melting point, 105 °C) and 30 parts by weight of polybutene-1 (melting point, 125 °C) which was used as a first layer (thickness, 10 μm) as a peel layer, and EMMA (melting point, 98 °C) as a second layer (thickness, 40 μm), were treated with ozone at the side of the EMMA layer and simultaneously co-extrusion-laminated at an extrusion temperature of 250 °C via an urethane anchoring agent onto the PET side of a substrate having the layer constitution of paper/polyethylene/aluminum foil/PET(polyethyleneterephthalate), to give a packaging material having the following constitution:

Paper (79 g/m²)/polyethylene (20 μm)/aluminum foil (7 μm)/PET (12 μm)/EMMA (40 μm)/peel layer (10 μm).

When this packaging material was used as a lid material for a paper cup for snack confectionary, which was formed from a raw paper having the layer construction of (paper (210 g/m²)/polyethylene (20 μm)/aluminum foil (7 μm)/EMMA (10 μm)/polyethylene (20 μm)), neither paper peel nor feathering

occurred upon unsealing. An easy open container excellent in sealing properties and heat resistance could thus be obtained.

(Example 11)

A mixture of 65 parts by weight of low-density polyethylene (melting point, 105 °C) and 35 parts by weight of polybutene-1 (melting point, 125 °C) which was used as a first layer (thickness, 10 μ m) as a peel layer, and EMAA (melting point, 100 °C) as a second layer (thickness, 35 μ m), were co-extrusion-laminated at an extrusion temperature of 290 °C onto the aluminum foil side of a substrate having the layer constitution of (PET (12 μ m)/aluminum foil (10 μ m)), to give a packaging material having the following constitution:

PET (12 μ m)/aluminum foil (10 μ m)/EMAA (35 μ m)/peel layer (10 μ m).

When this packaging material was used as a lid material for a paper cup for yogurt, which was formed from a paper (240 g/m²) coated inside with polyethylene having a melting point of 107 °C, neither paper peel nor feathering occurred upon unsealing. An easy open container excellent in sealing properties and heat resistance could thus be obtained.

What is claimed is:



1. An easy open packaging material comprising a substrate and a heat seal layer disposed on one side of said substrate, wherein said heat seal layer has a laminated structure provided with (B) a resin layer comprising an ethylene-unsaturated carboxylic acid copolymer and (A) a resin layer comprising 55 to 75 parts by weight of low-density polyethylene and 45 to 25 parts by weight of polybutene-1 in this order from the side of said substrate, and the resin layers (A) and (B) are mutually laminated by co-extrusion.
2. A packaging material according to claim 1, wherein the thickness of the resin layer (A) is in the range of 5 to 15 μm , and the thickness of the resin layer (B) is not less than the thickness of the resin layer (A).
3. A packaging material according to claim 1, wherein said low-density polyethylene is high-pressure processed low-density polyethylene having a melting point of 110 $^{\circ}\text{C}$ or less, said polybutene-1 is a homopolymer having a melting point of 120 $^{\circ}\text{C}$ or more, and the melting point of said ethylene-unsaturated carboxylic acid copolymer is lower than the melting point of said low-density polyethylene.
4. A packaging material according to claim 1, wherein said heat seal layer is laminated on the substrate by co-extrusion

lamination.



5. An easy open container comprising a paper cup container having an innermost layer comprising polyethylene having a melting point of 105 to 115 °C and a packaging material comprising a substrate and a heat seal layer disposed on one side of said substrate, said heat seal layer having a laminated structure provided with (B) a resin layer comprising an ethylene-unsaturated carboxylic acid copolymer and (A) a resin layer comprising 55 to 75 parts by weight of low-density polyethylene and 45 to 25 parts by weight of polybutene-1 in this order from the side of said substrate, and the resin layers (A) and (B) being mutually laminated by co-extrusion, wherein the packaging material is heat-sealed as a lid material of a paper cup container, and upon unsealing, the resin layer (A) undergoes cohesive failure.

6. An easy open container according to claim 5, wherein the thickness of the resin layer (A) is in the range of 5 to 15 μm , and the thickness of the resin layer (B) is not less than the thickness of the resin layer (A).

7. An easy open container according to claim 5, wherein said low-density polyethylene is high-pressure processed low-density polyethylene having a melting point of 110 °C or less, said polybutene-1 is a homopolymer having a melting point of 120 °C or more, and the melting point of said ethylene-



unsaturated carboxylic acid copolymer is lower than the melting point of said low-density polyethylene.

8. An easy open container according to claim 5, wherein said heat seal layer is laminated on the substrate by co-extrusion lamination.