

MULTILAYER FILM CONTAINING A BIAXIALLY ORIENTED POLYPROPYLENE FILM

BACKGROUND OF THE INVENTION

The present invention relates to a multilayer film containing a biaxially oriented polypropylene film as a base layer having a metal layer, deposited by metallization, on one surface thereof.

German Patent No. 2,756,497 discloses a composite film for packaging purposes containing two polyolefin films and an intermediately situated metal layer, at least one of the two polyolefin films having been oriented by stretching and being composed of isotactic polypropylene. The metal layer is formed by metallization of one of the two films and has a specific resistance of 1 to 5 Ω -cm. The other of the two films is composed of polyethylene, polypropylene, a crystalline ethylene/propylene copolymer or of mixtures thereof and has likewise been stretched. At least one of the two films is coated with a heat-sealing layer. The purpose of said composite film is to achieve the result that permanently good barrier properties are obtained even under stress due to folding and creasing.

European Patent No. 021,672 describes a method for preparing a metal-coated oriented polypropylene film. In this method, a film substrate comprising a polypropylene core layer and an ethylene/polypropylene copolymer outer layer on at least one side of the core layer is produced by coextrusion. Neither the core layer nor the outer layer contains a lubricant. Coextrusion is followed by a biaxial orientation or stretching of the film, a corona discharge treatment of at least the outer surface of the film and by metallization of the corona-treated outer layer. The outer layer contains 2 to 4% by weight of ethylene and 96 to 98% by weight of propylene. The metal layer is composed of aluminum, copper, silver or chromium. The omission of the lubricant reinforces the adhesion between the core layer or the outer layer, on the one hand, and the metal layer, on the other hand. In a particular range, the metal layer develops barrier effects towards oxygen, water vapor and carbon dioxide.

Published European Patent Application No. 0,038,022 discloses a composite film which is composed of two layers and an intermediately situated adhesive layer, one of the layers being composed of a polyolefin film and the other layer of paper or a cardboard. The polyolefin film is metallized at least on one side, the metal layer having a resistance in the range from 1 to 5 Ω . The polyolefin film is oriented by stretching and is composed of isotactic polypropylene, polyethylene, propylene/ethylene copolymers or of mixtures of said materials, while aluminum is used for the metal layer. There is a heat-sealing layer on at least one of the two sides of the composite film.

European Patent No. 0,069,642 describes a composite film composed of two layers of a thermoplastic polymer metallized on one side, the layers being joined to each other by an adhesive layer. One of the two layers of the thermoplastic polymer is composed of ethylene glycol polyterephthalate. The two layers of the metallized thermoplastic polymer can be joined together by means of their metallized surfaces. It is equally possible to join the two layers of the metallized thermoplastic polymer to each other by means of the metallized surface and the thermoplastic surface. Aluminum is used for metallization. The thermoplastic polymer of the second layer is

chosen, for example, from the group comprising ethylene glycol polyterephthalate and polypropylenes. An additional outer layer composed of a thermoplastic polymer may be deposited on the metal layer. A polyurethane may be used as adhesive between the two metal layers.

The known composite films solve one problem or another, such as, for example, increasing the metallizability of the composite film, possessing good heat-sealing properties, in particular, a low heat-sealing temperature, or improving, the processing properties after metallization, such as, for example, printing, slitting and processing in a packaging machine.

SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide an improved multilayer film.

A further object of the invention is to provide multilayer film having improved metallizability, wherein a polypropylene film is used as a base layer.

It is also an object of the invention to provide a multilayer film having reduced susceptibility to scratching.

Another object of the invention resides in providing a good optical appearance of the film as a result of the high luster of the metal layer.

Still another object of the invention is to ensure good heat-sealing properties, in particular a low heat-sealing temperature, of the film according to the invention.

It is also an object of the invention to improve the processing properties after metallization, such as printing, slitting and further processing in a packaging machine.

In accomplishing the foregoing objects, there has been provided in accordance with one aspect of the present invention a multilayer film, comprising: a biaxially oriented polypropylene film as a base layer; a first surface layer comprising a metal layer deposited by metallization on a surface which is free from organic additives, such as lubricants or antistatic agents and which has been exposed to a corona discharge before the metallization; and a second surface layer comprising a heat-sealing layer containing an additive combination comprised of an inorganic pigment and a polydiorganosiloxane, the second surface layer being applied on one surface of the base layer. In one embodiment, the multilayer film further includes an intermediate layer between the base layer and the metal layer, this intermediate layer containing from about 0.1 to 0.7% by weight of an inorganic pigment and comprising a non-heat-sealable corona-treated polypropylene.

In accordance with another aspect of the invention, there has been provided a package which includes at least one wall made of the above-described multilayer film material.

Further objects, features and advantages of the present invention will become apparent from the detailed description of preferred embodiments that follows, when considered together with the attached figures of drawing.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 shows a so-called ABC structure of a multilayer film in section; and

FIG. 2 shows a so-called AB structure of the multilayer film according to the invention.