Patent Literature 2: JP H02-276807A

Patent Literature 3: JP H04-213309A

Patent Literature 4: WO 93/08221

Patent Literature 5: JP H08-311260A

Patent Literature 6: JP 2006-233207A

Patent Literature 7: JP 2009-197225A

Patent Literature 8: WO 2013/099927

Patent Literature 9: JP 2014-177506A

Summary

[0008a]

In a first aspect of the present disclosure, there is provided an ethylene-α-olefin copolymer (A) which is a copolymer of ethylene and one or more α-olefins having 4 to 10 carbon atoms, and which satisfies the following requirements (1) to (7):

(1) the density is in a range of 890 kg/m^3 or more and 925 kg/m^3 or less;

(2) the melt flow rate (MFR) at 190°C under a load of 2.16 kg is in a range of 3.0 g/10 min or more and 15.0 g/10 min or less;

(3) the ratio [MT/η^* (g/P)] of the melt tension [MT (g)] at 190°C to the shear viscosity [η^* (P)] at 200°C at the angular

velocity of 1.0 rad/s is in a range of 1.40×10^{-4} or more and 2.90×10^{-4} or less;

(4) the zero shear viscosity [η_0 (P)] at 200°C and the weight average molecular weight (Mw) as measured by GPC-viscometry (GPC-VISCO) satisfy the following equation (Eq-1):

$$0.01 \times 10^{-13} \times Mw^{3.4} \leq \eta_0 \leq 4.5 \times 10^{-13} \times Mw^{3.4} \quad \text{... (Eq-1);}$$

(5) the number average molecular weight (Mn), the weight average molecular weight (Mw), and the Z average molecular weight (Mz) as measured by GPC-viscometry (GPC-VISCO) satisfy the following equation (Eq-2):

$$-2.0 \leq Mz/Mw - Mw/Mn \leq 15 \quad \text{... (Eq-2);}$$

(6) the total number of vinyls, vinylidenes, disubstituted internal olefins, and trisubstituted internal olefins per 1000 carbon atoms (number/1000 C) as measured by ^{1}H-NMR is in a range of 0.1 or more and 1.0 or less; and

(7) a plurality of peaks is present in a melting curve obtained by differential scanning calorimetry (DSC).

[0008b]

In another aspect of the present disclosure, there is provided a thermoplastic resin composition (Y) comprising: the ethylene-α-olefin copolymer (A) as disclosed herein, and a thermoplastic resin excluding the ethylene-α-olefin copolymer (A).

[0008c]

In yet another aspect of the present disclosure, there is provided a film comprising the ethylene-α-olefin copolymer (A) as disclosed herein or the thermoplastic resin composition (Y) as disclosed herein.

[0008d]

In a further aspect of the present disclosure, there is provided a laminate comprising a layer comprising the ethylene-α-olefin copolymer (A) as disclosed herein or the thermoplastic resin composition (Y) as disclosed herein.

[0008e]

In another aspect of the present disclosure, there is provided a method for producing a laminate, comprising extrusion-laminating the ethylene-α-olefin copolymer (A) as disclosed herein or the thermoplastic resin composition (Y) as disclosed herein between a substrate layer and a barrier layer.

Technical Problem

[0009]

An object of the present invention is to provide an ethylene-α-olefin copolymer that is excellent in formability and is also capable of forming a film that is particularly excellent in mechanical strength compared to conventionally known ethylene polymers, a thermoplastic resin composition including the polymer, and a film and a laminate obtained from the polymer or the thermoplastic resin composition.

A further object of the present invention is to provide an ethylene resin composition that is capable of producing a shaped article (for example, a film, and a multilayer film having the film) that is excellent in transparency, as well as a shaped article (for example, a film, and a multilayer