In a first aspect of the present disclosure, there is provided an ethylene resin composition (Z) comprising:

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 (4) and (7); and

an ethylene-α-olefin copolymer (B) which is a copolymer of ethylene and one or more α-olefins having 4 to 10 carbon atoms and which satisfies the following requirements (a) to (c),

having a mass fraction (W_A) of the ethylene-α-olefin copolymer (A) that is 1% by mass or more and 50% by mass or less, and a mass fraction (W_B) of the ethylene-α-olefin copolymer (B) that is 50% by mass or more and 99% by mass or less, provided that the sum of W_A and W_B is 100% by mass:

(1) the density is in a range of 890 kg/m^3 or more and 935 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 0.1 g/10 min or more and less than 3.0 g/10 min,

(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 and an angular velocity of 1.0 rad/s is in a range of 1.20×10^{-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) measured by GPC-viscometry (GPC-VISCO) satisfy the following equation (Eq-1):

$$0.01 \times 10^{-13} \times Mw^{3.4} \leq \eta_0 \leq 2.5 \times 10^{-13} \times Mw^{3.4} \cdots (Eq\text{-}1),$$

and

(7) the intrinsic viscosity [[η] (dl/g)] measured in decalin at 135°C and the weight-average molecular weight (Mw) measured by GPC-viscometry (GPC-VISCO) satisfy the following equation (Eq-3):

$$0.7 \times 10^{-4} \times Mw^{0.776} \leq [\eta] \leq 1.65 \times 10^{-4} \times Mw^{0.776} \cdots (Eq\text{-}3),$$

(a) the density is in a range of 890 kg/m^3 or more and 930 kg/m^3 or less,

(b) the melt flow rate (MFR) at 190°C under a load of 2.16 kg is in a range of 0.1 g/10 min or more and 10 g/10 min or less, and

(c) the intrinsic viscosity [[η] (dl/g)] measured in decalin at 135°C and the weight-average molecular weight (Mw) measured by GPC-viscometry (GPC-VISCO) satisfy the following equation (Eq-4):

$$1.90 \times 10^{-4} \times Mw^{0.776} \leq [\eta] \leq 2.80 \times 10^{-4} \times Mw^{0.776} \cdots (Eq\text{-}4).$$

[0007b]

In another aspect of the present disclosure, there is provided a shaped article comprising the ethylene resin composition (Z) as disclosed herein.

[0007c]

In yet another aspect of the present disclosure, there is provided a film comprising the ethylene resin composition as disclosed herein.

[0007d]

In a further aspect of the present disclosure, there is provided a multilayer film comprising a layer comprising the ethylene resin composition (Z) as disclosed herein.

Technical Problem

[0008]

CLAIMS

[Claim 1]

An ethylene resin composition (Z) comprising:

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 (4) and (7); and

an ethylene-α-olefin copolymer (B) which is a copolymer of ethylene and one or more α-olefins having 4 to 10 carbon atoms and which satisfies the following requirements (a) to (c),

having a mass fraction (W_A) of the ethylene-α-olefin copolymer (A) that is 1% by mass or more and 50% by mass or less, and a mass fraction (W_B) of the ethylene-α-olefin copolymer (B) that is 50% by mass or more and 99% by mass or less, provided that the sum of W_A and W_B is 100% by mass:

(1) the density is in a range of 890 kg/m^3 or more and 935 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 0.1 g/10 min or more and less than 3.0 g/10 min,

(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 and an angular

velocity of 1.0 rad/s is in a range of 1.20×10^{-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) measured by GPC-viscometry (GPC-VISCO) satisfy the following equation (Eq-1):

$$0.01 \times 10^{-13} \times Mw^{3.4} \leq \eta_0 \leq 2.5 \times 10^{-13} \times Mw^{3.4} \cdots (Eq\text{-}1),$$

and

(7) the intrinsic viscosity [[η] (dl/g)] measured in decalin at 135°C and the weight-average molecular weight (Mw) measured by GPC-viscometry (GPC-VISCO) satisfy the following equation (Eq-3):

$$0.7 \times 10^{-4} \times Mw^{0.776} \leq [\eta] \leq 1.65 \times 10^{-4} \times Mw^{0.776} \cdots (Eq\text{-}3),$$

(a) the density is in a range of 890 kg/m^3 or more and 930 kg/m^3 or less,

(b) the melt flow rate (MFR) at 190°C under a load of 2.16 kg is in a range of 0.1 g/10 min or more and 10 g/10 min or less, and

(c) the intrinsic viscosity [[η] (dl/g)] measured in decalin at 135°C and the weight-average molecular weight (Mw) measured by GPC-viscometry (GPC-VISCO) satisfy the following equation (Eq-4):

$$1.90 \times 10^{-4} \times Mw^{0.776} \leq [\eta] \leq 2.80 \times 10^{-4} \times Mw^{0.776} \cdots (Eq\text{-}4).$$

[Claim 2]

The ethylene resin composition (Z) according to claim 1 , wherein the ethylene-α-olefin copolymer (A) satisfies the following requirement (5):

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

$$-7.0 \leq Mz/Mw - Mw/Mn \leq 2.0 \cdots(Eq\text{-}2).$$

[Claim 3]

The ethylene resin composition (Z) according to claim 1 or 2, wherein the ethylene-α-olefin copolymer (A) further satisfies the following requirement (6):

(6) the ratio Mz/Mw of the z-average molecular weight (Mz) to the weight-average molecular weight (Mw) measured by GPC-viscometry (GPC-VISCO) is in a range of 4.0 or more and 15.0 or less.

[Claim 4]

The ethylene resin composition (Z) according to any of claims 1 to 3, wherein the ethylene-α-olefin copolymer (A) satisfies the following requirement (8):

(8) the total number (/1000 C) of vinyls, vinylidenes, disubstituted internal olefins, and trisubstituted internal

olefins per 1000 carbon atoms measured by ^{1}H-NMR is in a range of 0.1 or more and 1.0 or less.

[Claim 5]

The ethylene resin composition (Z) according to any of claims 1 to 4, wherein the ethylene-α-olefin copolymer (A) satisfies the following requirement (9):

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

[Claim 6]

The ethylene resin composition (Z) according to any one of claims 1 to 5, further comprising a thermoplastic resin excluding the ethylene-α-olefin copolymer (A) and the ethylene-α-olefin copolymer (B).

[Claim 7]

A shaped article comprising the ethylene resin composition (Z) according to any one of claims 1 to 6.

[Claim 8]

A film comprising the ethylene resin composition according to any one of claims 1 to 6.

[Claim 9]

A multilayer film comprising a layer comprising the ethylene resin composition (Z) according to any one of claims 1 to 6.