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SUMMARY

[0011a] In one aspect of the present disclosure, there is provided a viscosity modifier for lubricating oils comprising an ethylene·α-olefin copolymer (A) which comprises 30 to 50 mole% of structural units derived from at least one α-olefin selected from α-olefins having 4 and 5 carbon atoms and 50 to 70 mole% of structural units derived from ethylene (with the proviso that the total of all structural units of said copolymer is 100 mole%) and which satisfies the following requirements (a), (b), and (c):

(a): a glass transition temperature (Tg) as measured by differential scanning calorimetry (DSC) is in a range of -75 to -65°C;

(b): a melting point (Tm) as measured by differential scanning calorimetry (DSC) is not substantially observed or is not a melting point (Tm) of -25°C or more; and

(c): intrinsic viscosity [η] as measured in a decalin solvent at 135°C is 1.0 to 2.8 dl/g, and

wherein the ethylene·α-olefin copolymer comprises 1-butene as a structural unit.

[0011b] In another aspect of the present disclosure, there is provided an additive composition for lubricating oils comprising the viscosity modifier for lubricating oils disclosed herein and an oil (B),

wherein the additive composition for lubricating oils comprises the ethylene·α-olefin copolymer (A) and the oil (B) at a weight ratio (A)/(B) of 1/99 to 50/50.

[0011c] In a further aspect of the present disclosure, there is provided a lubricating oil composition comprising the viscosity modifier for lubricating oils according to any one of claims 1 to 2 and a lubricating oil base (BB),

wherein the ethylene·α-olefin copolymer (A) is contained in an amount of 0.1 to 5% by weight in 100 % by weight of said lubricating oil composition.

PROBLEMS TO BE SOLVED BY THE INVENTION

[0012] It is an object of the present invention to provide a viscosity modifier for lubricating oils for obtaining an additive composition for lubricating oils having excellent fluidity in a wide temperature range from low temperature to high temperature. Further, it is an object of the present invention to provide a viscosity modifier for lubricating oils for obtaining a lubricating oil composition capable of reducing viscosity in good balance in a wide temperature range from low temperature to high temperature.

[0013] It is an object of the present invention to provide an additive composition for lubricating oils having excellent fluidity in a wide temperature range from low temperature to high temperature.

It is an object of the present invention to provide a lubricating oil composition capable of reducing viscosity in good balance in a wide temperature range from low temperature to high temperature.

MEANS FOR SOLVING THE PROBLEMS

[0014] As a result of intensive investigation, the present inventors found that an additive composition for lubricating oils having excellent fluidity in a wide temperature range from low temperature to high temperature as compared to a conventional additive composition for lubricating oils is obtained by using a viscosity modifier for lubricating oils containing a specific ethylene·α-olefin copolymer in an additive composition for lubricating oils. Further, it was found that a lubricating oil composition capable of reducing viscosity in

What is claimed is:

1. A viscosity modifier for lubricating oils comprising an ethylene·α-olefin copolymer (A) which comprises 30 to 50 mole% of structural units derived from at least one α-olefin selected from α-olefins having 4 and 5 carbon atoms and 50 to 70 mole% of structural units derived from ethylene (with the proviso that the total of all structural units of said copolymer is 100 mole%) and which satisfies the following requirements (a), (b), and (c):

(a): a glass transition temperature (Tg) as measured by differential scanning calorimetry (DSC) is in a range of -75 to -65°C;

(b): a melting point (Tm) as measured by differential scanning calorimetry (DSC) is not substantially observed or is not a melting point (Tm) of -25°C or more; and

(c): intrinsic viscosity [η] as measured in a decalin solvent at 135°C is 1.0 to 2.8 dl/g, and

wherein the ethylene·α-olefin copolymer comprises 1-butene as a structural unit.

2. The viscosity modifier for lubricating oils according to claim 1, wherein the weight average molecular weight of the ethylene·α-olefin copolymer (A) is 100,000 to 400,000 as measured by gel permeation chromatography (GPC).

3. An additive composition for lubricating oils comprising the viscosity modifier for lubricating oils according to any one of claims 1 to 2 and an oil (B),

wherein the additive composition for lubricating oils comprises the ethylene·α-olefin copolymer (A) and the oil (B) at a weight ratio (A)/(B) of 1/99 to 50/50.

4. A lubricating oil composition comprising the viscosity modifier for lubricating oils according to any one of claims 1 to 2 and a lubricating oil base (BB),

wherein the ethylene·α-olefin copolymer (A) is contained in an amount of 0.1 to 5% by weight in 100 % by weight of said lubricating oil composition.

5. The lubricating oil composition according to claim 4, wherein a pour-point depressant (C) is contained in an amount of 0.05 to 5% by weight in 100% by weight of said lubricating oil composition.