Claims

1. A polymer comprising a conjugated diene monomer unit and a vinyl aromatic monomer unit,

wherein the polymer has a polymer block (A) comprising the vinyl aromatic monomer unit as a main component and a polymer block (B) comprising the conjugated diene monomer unit and the vinyl aromatic monomer unit,

a bragg plane spacing is 27 nm or more and 50 nm or less,

a hydrogenation rate of double bonds in the conjugated diene monomer unit is 0 mol% or more and 90 mol% or less,

the polymer has a peak top of loss tangent (tan δ) in the range of -70 to 0°C in a dynamic viscoelastic spectrum and a value of the peak top is 1.5 or less, and

the polymer block (B) is a random block.

2. The polymer according to claim 1, wherein the hydrogenation rate of double bonds in the conjugated diene monomer unit is 50 mol% or more and 90 mol% or less.

3. The polymer according to claim 1 or 2, wherein the polymer has a peak top of loss tangent in the range of -55 to -10°C in a dynamic viscoelastic spectrum and a value of the peak top is 0.7 or more and 1.5 or less.

4. The polymer according to claim 1 or 2, wherein a content of the vinyl aromatic monomer unit is 20% by mass or more and 60% by mass or less.

5. The polymer according to claim 1 or 2, wherein a content of the polymer block (A) is 10% by mass or more and 40% by mass or less.

6. The polymer according to claim 1 or 2, wherein a content of a short-chain vinyl aromatic monomer-polymerized part consisting of 2 to 6 vinyl aromatic monomer units in the polymer block (B) is 50% by mass or more based on the content of the vinyl aromatic monomer unit in the polymer block (B) being 100% by mass.

7. The polymer according to claim 6, wherein the content of the short-chain vinyl aromatic monomer-polymerized part in the polymer block (B) is 70% by mass or more based

on the content of the vinyl aromatic monomer unit in the polymer block (B) being 100% by mass.

8. The polymer according to claim 1 or 2, wherein the conjugated diene monomer unit comprises a conjugated diene monomer unit (a) derived from a 1,2-bond and/or a 3,4-bond and a conjugated diene monomer unit (b) derived from a 1,4-bond, and

when a total content of the conjugated diene monomer unit is 100% by mass, a content of an alkenyl monomer unit (a1) with the conjugated diene monomer unit (a) hydrogenated is 10% by mass or more and 50% by mass or less, and a content of an alkenyl monomer unit (b1) with the conjugated diene monomer unit (b) hydrogenated is 0% by mass or more and 80% by mass or less, and a sum of the contents of an unhydrogenated conjugated diene monomer unit (a) and an unhydrogenated conjugated diene monomer unit (b) after hydrogenation is 0% by mass or more and 90% by mass or less.

9. The polymer according to claim 1 or 2, wherein the weight average molecular weight is 50000 or more and 400000 or less.

10. The polymer according to claim 1 or 2, wherein the content of the conjugated diene monomer unit (a) derived from a 1,2-bond and/or a 3,4-bond is 10 mol% or more and 50 mol% or less based on the total content of the conjugated diene monomer unit.

11. The polymer according to claim 1 or 2, wherein the polymer has a functional group.

12. An asphalt composition comprising 0.5 parts by mass or more and 50 parts by mass or less of the polymer according to claim 1 or 2 and 100 parts by mass of asphalt.

13. An asphalt composition comprising 0.5 parts by mass or more and 50 parts by mass or less in total of the polymer according to claim 1 or 2 and a block copolymer (α), and 100 parts by mass of asphalt,

wherein the block copolymer (α) has at least one polymer block (A) comprising a vinyl aromatic monomer unit as a main component and at least one polymer block (C) comprising a conjugated diene monomer unit as a main component, and

the content of the block copolymer (α) is 15 to 85% by mass in the total content of the polymer according to claim 1 or 2 and the block copolymer (α).

14. The asphalt composition according to claim 12, further comprising 0.03 parts by mass or more and 3 parts by mass or less of sulfur and/or a sulfur compound based on 100 parts by mass of the asphalt.

15. The asphalt composition according to claim 13, further comprising 0.03 parts by mass or more and 3 parts by mass or less of sulfur and/or a sulfur compound based on 100 parts by mass of the asphalt.

16. An asphalt composition comprising

0.5 parts by mass or more and 50 parts by mass or less of a polymer comprising a conjugated diene monomer unit and a vinyl aromatic monomer unit, and

100 parts by mass of asphalt,

wherein the polymer has a polymer block (A) comprising the vinyl aromatic monomer unit as a main component and a polymer block (B) comprising the conjugated diene monomer unit and the vinyl aromatic monomer unit,

a bragg plane spacing is 27 nm or more and 50 nm or less,

a hydrogenation rate of double bonds in the conjugated diene monomer unit is 0 mol% or more and 90 mol% or less,

the polymer has a peak top of loss tangent (tan δ) in the range of -55 to -10°C in a dynamic viscoelastic spectrum and a value of the peak top is 0.7 or more and 1.5 or less, and

the polymer block (B) is a random block.

17. An asphalt composition comprising

0.5 parts by mass or more and 50 parts by mass or less of a polymer comprising a conjugated diene monomer unit and a vinyl aromatic monomer unit, and

100 parts by mass of asphalt,

wherein the polymer has a polymer block (A) comprising the vinyl aromatic monomer unit as a main component and a polymer block (B) comprising the conjugated diene monomer unit and the vinyl aromatic monomer unit,

a bragg plane spacing is 27 nm or more and 50 nm or less,

a hydrogenation rate of double bonds in the conjugated diene monomer unit is 0 mol% or more and 90 mol% or less,

the polymer has a peak top of loss tangent (tan δ) in the range of -55 to -10°C in a dynamic viscoelastic spectrum and a value of the peak top is 0.7 or more and 1.5 or less,

the polymer block (B) is a random block, and

a content of the short-chain vinyl aromatic monomer-polymerized part consisting of 2 to 6 vinyl aromatic monomer units in the polymer block (B) is 70% by mass or more based on the content of the vinyl aromatic monomer unit in the polymer block (B) being 100% by mass.

18. An asphalt composition comprising

0.5 parts by mass or more and 50 parts by mass or less of a polymer comprising a conjugated diene monomer unit and a vinyl aromatic monomer unit, and

100 parts by mass of asphalt,

wherein the polymer has a polymer block (A) comprising the vinyl aromatic monomer unit as a main component and a polymer block (B) comprising the conjugated diene monomer unit and the vinyl aromatic monomer unit,

a bragg plane spacing is 27 nm or more and 50 nm or less,

a hydrogenation rate of double bonds in the conjugated diene monomer unit is 0 mol% or more and 90 mol% or less,

the polymer has a peak top of loss tangent (tan δ) in the range of -55 to -10°C in a dynamic viscoelastic spectrum and a value of the peak top is 0.7 or more and 1.5 or less,

the polymer block (B) is a random block, and

the polymer has a functional group.