Claims

[Claim 1]

A modified conjugated diene-based polymer

having a weight average molecular weight of 20×10^4 or more and 300×10^4 or less, and

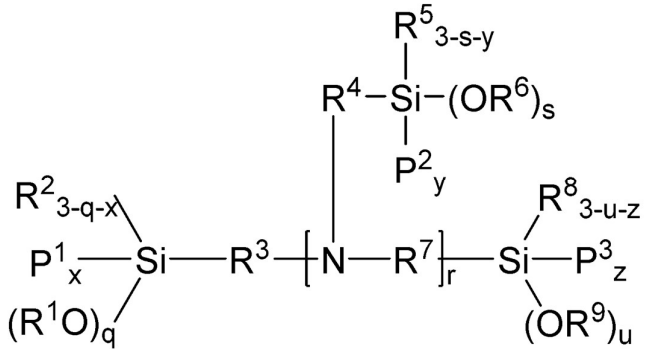
having a star-branched structure with a conjugated diene-based polymer chain bonded to a modifier residue,

wherein the modifier residue has at least 4 silicon atoms, and alkoxy groups and/or hydroxyl groups and

the conjugated diene-based polymer chain is bonded to the silicon atom,

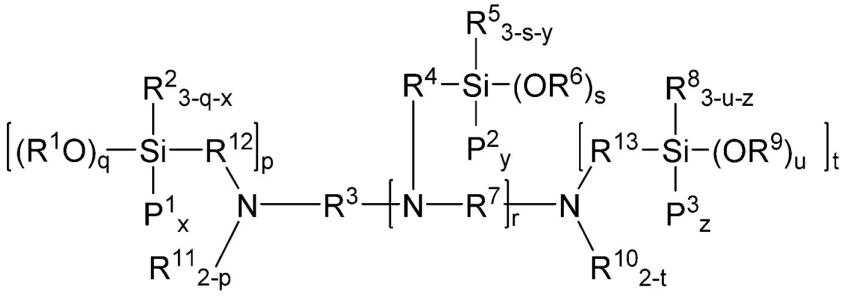
wherein the number of the alkoxy groups and/or the hydroxyl groups in the modifier residue is larger than the number of the silicon atoms on average

wherein the modified conjugated diene-based polymer is represented by the following general formula (1) or general formula (2);



(1)

wherein P^1 to P^3 each independently represent a conjugated diene-based polymer chain; R^3, R^4 and R^7 each independently represent an alkylene group having 1 to 20 carbon atoms; R^2, R^5 and R^8 each independently represent an alkyl group having 1 to 20 carbon atoms; and R^1, R^6 and R^9 each independently represent a hydrogen atom or an alkyl group having 1 to 20 carbon atoms; x, y and z each independently represent an integer of 1 to 2, q, s and u each independently represent an integer of 0 to 3, r represents an integer of 2 to 6, and the number of the conjugated diene-based polymer chain (x + (y × r) + z) is an integer of 3 to 20; the number of the alkoxy groups (q + (s × r) + u) exceeds the number of the silicon atoms, and a ratio of the number of the alkoxy groups to the number of the conjugated diene-based polymer chains (q + (s × r) + u) / (x + (y × r) + z) exceeds 0.5;



(2)

wherein P^1 to P^3 each independently represent a conjugated diene-based polymer chain; R^3, R^4, R^7 R^{12} and R^{13} each independently represent an alkylene group having 1 to 20 carbon atoms; R^2, R^5 and R^8 each independently

represent an alkyl group having 1 to 20 carbon atoms; R^1, R^6 and R^9 each independently represent a hydrogen atom or an alkyl group having 1 to 20 carbon atoms; and R^{10} and R^{11} each independently represent a hydrogen atom or an alkyl group having 1 to 20 carbon atoms; x, y and z each independently represent an integer of 1 to 2; p and t each independently represent an integer of 1 to 2; q, s and u each independently represent an integer of 0 to 3; r represents an integer of 0 to 6; the number of the conjugated diene-based polymer chain ((x × p) + (y × r) + (z × t)) is an integer of 3 to 20; the number of the alkoxy groups ((q × p) + (s × r) + (u × t)) exceeds the number of the silicon atoms, and a ratio of the number of the alkoxy groups to the number of the conjugated diene-based polymer chains ((q × p) + (s × r) + (u × t)) / ((x × p) + (y × r) + (z × t)) exceeds 0.5.

[Claim 2]

The modified conjugated diene-based polymer according to claim 1, wherein the number of the alkoxy groups and/or the hydroxyl groups in the modifier residue is 1.2 times or more of the number of the silicon atoms on average.

[Claim 3]

The modified conjugated diene-based polymer according to claim 1 or 2, wherein the modifier residue has at least 2 nitrogen atoms and at least 4 silicon atoms.

[Claim 4]

An oil-extended modified conjugated diene-based polymer comprising:

100 parts by mass of the modified conjugated diene-based polymer according to any one of claims 1 to 3, and

1 to 60 parts by mass of an extender oil.

[Claim 5]

A rubber composition comprising:

a rubber component and 5.0 parts by mass or more and 150 parts by mass of a filler based on 100 parts by mass of the rubber component,

wherein the rubber component comprises 10% by mass or more of the modified conjugated diene-based polymer according to any one of claims 1 to 4 based on a total amount of the rubber component.

[Claim 6]

A tire comprising the rubber composition according to claim 5.