CLAIMS

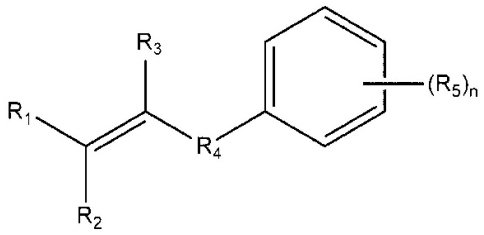
1. A modified conjugated diene-based polymer comprising a first polymer chain and a second polymer chain, comprising a repeating unit derived from a conjugated diene-based monomer and a derived unit from a nitrogen-containing modification initiator in each,
wherein the first polymer chain comprises a derived unit from an aminoalkoxysilane-based modifier in at least one terminal,
the second polymer chain comprises a derived unit from an aminoepoxy-based modifier in at least one terminal, and
the aminoalkoxysilane-based modifier comprises 6 or more alkoxy groups in a molecule.,
wherein the modified conjugated diene-based polymer has a glass transition temperature of -70℃ to -40℃.

2. The modified conjugated diene-based polymer of claim 1, wherein each of the first polymer chain and the second polymer chain further comprises a repeating unit derived from an aromatic vinyl-based monomer.

3. The modified conjugated diene-based polymer of claim 1, wherein the aminoepoxy-based modifier comprises 4 or less polymer modification functional groups in a molecule, and
the polymer modification functional group comprises an epoxy group, or an alkoxy group and an epoxy group.

4. The modified conjugated diene-based polymer of claim 1, wherein the nitrogen-containing modification initiator is a reaction product of a nitrogen-containing compound and an organometallic compound, and
the nitrogen-containing compound is a styrene-based compound comprising a substituted with a substituent or unsubstituted amino group, amide group, imino group, imidazole group, pyrimidyl group or cyclic amino group in a molecule, where the substituent is an alkyl group of 1 to 20 carbon atoms, a cycloalkyl group of 3 to 20 carbon atoms, an aryl group of 6 to 20 carbon atoms, an alkylaryl group of 7 to 20 carbon atoms, an arylalkyl group of 7 to 20 carbon atoms, or an alkoxysilyl group of 1 to 10 carbon atoms.

5. The modified conjugated diene-based polymer of claim 4, wherein the nitrogen-containing compound is a compound represented by the following Formula 1:
[Formula 1]



in Formula 1,

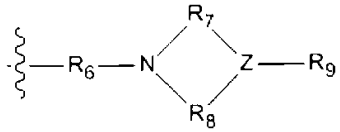
R_1 to R_3 are each independently hydrogen; an alkyl group of 1 to 30 carbon atoms; an alkenyl group of 2 to 30 carbon atoms; an alkynyl group of 2 to 30 carbon atoms; a heteroalkyl group of 1 to 30 carbon atoms, a heteroalkenyl group of 2 to 30 carbon atoms; a heteroalkynyl group of 2 to 30 carbon atoms; a cycloalkyl group of 5 to 30 carbon atoms; an aryl group of 6 to 30 carbon atoms; or a heterocyclic group of 3 to 30 carbon atoms,

R_4 is a single bond; a substituted with a substituent or unsubstituted alkylene group of 1 to 20 carbon atoms; a substituted with a substituent or unsubstituted cycloalkylene group of 5 to 20 carbon atoms; or a substituted with a substituent or unsubstituted arylene group of 5 to 20 carbon atoms, where the substituent is an alkyl group of 1 to 10 carbon atoms, a cycloalkyl group of 5 to 10 carbon atoms, or an aryl group of 5 to 20 carbon atoms,

R_5 is an alkyl group of 1 to 30 carbon atoms; an alkenyl group of 2 to 30 carbon atoms; an alkynyl group of 2 to 30 carbon atoms; a heteroalkyl group of 1 to 30 carbon atoms; a heteroalkenyl group of 2 to 30 carbon atoms; a heteroalkynyl group of 2 to 30 carbon atoms; a cycloalkyl group of 5 to 30 carbon atoms; an aryl group of 6 to 30 carbon atoms; a heterocyclic group of 3 to 30 carbon atoms; or a functional group represented by the following Formula 1a or Formula 1b, and

n is an integer of 1 to 5, at least one among R_5 groups is a functional group represented by the following Formula 1a or Formula 1b, in the case where n is an integer of 2 to 5, multiple R_5 groups may be the same or different from each other:

[Formula 1a]



in Formula 1a,

R_6 is a substituted with a substituent or unsubstituted alkylene group of 1 to 20 carbon atoms; a substituted with a substituent or unsubstituted cycloalkylene group of 5 to 20 carbon atoms; or a substituted with a substituent or unsubstituted arylene group of 5 to 20 carbon atoms, where the substituent is an alkyl group of 1 to 10 carbon atoms, a cycloalkyl group of 5 to 10 carbon atoms, or an aryl group of 5 to 20 carbon atoms,

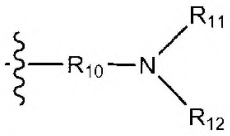
R_7 and R_8 are each independently an alkylene group of 1 to 20 carbon atoms substituted with an alkyl group of 1 to 10 carbon atoms, a cycloalkyl group of 5 to 20 carbon atoms, or an aryl group of 5 to 20 carbon atoms or unsubstituted,

R_9 is hydrogen; an alkyl group of 1 to 30 carbon atoms; an alkenyl group of 2 to 30 carbon

atoms; an alkynyl group of 2 to 30 carbon atoms; a heteroalkyl group of 1 to 30 carbon atoms; a heteroalkenyl group of 2 to 30 carbon atoms; a heteroalkynyl group of 2 to 30 carbon atoms; a cycloalkyl group of 5 to 30 carbon atoms; an aryl group of 6 to 30 carbon atoms; or a heterocyclic group of 3 to 30 carbon atoms, and

Z is an N, O or S atom, in the case where Z is O or S, R_9 is not present,

[Formula 1b]



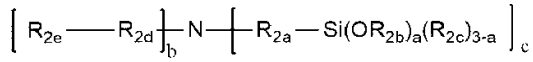
in Formula 1b,

R_{10} is a substituted with a substituent or unsubstituted alkylene group of 1 to 20 carbon atoms; a substituted with a substituent or unsubstituted cycloalkylene group of 5 to 20 carbon atoms; or a substituted with a substituent or unsubstituted arylene group of 5 to 20 carbon atoms, where the substituent is an alkyl group of 1 to 10 carbon atoms, a cycloalkyl group of 5 to 10 carbon atoms, or an aryl group of 5 to 20 carbon atoms, and

R_{11} and R_{12} are each independently an alkyl group of 1 to 30 carbon atoms; an alkenyl group of 2 to 30 carbon atoms; an alkynyl group of 2 to 30 carbon atoms; a heteroalkyl group of 1 to 30 carbon atoms; a heteroalkenyl group of 2 to 30 carbon atoms; a heteroalkynyl group of 2 to 30 carbon atoms; a cycloalkyl group of 5 to 30 carbon atoms; an aryl group of 6 to 30 carbon atoms; or a heterocyclic group of 3 to 30 carbon atoms.

6. The modified conjugated diene-based polymer of claim 1, wherein the aminoalkoxysilane-based modifier is one or more selected from compounds represented by the following Formula 2 to Formula 4:

[Formula 2]



in Formula 2,

R_{2a} and R_{2d} are each independently a single bond, a substituted with a substituent or unsubstituted alkylene group of 1 to 20 carbon atoms; a substituted with a substituent or unsubstituted cycloalkylene group of 5 to 20 carbon atoms; or a substituted with a substituent or unsubstituted arylene group of 6 to 20 carbon atoms, where the substituent is an alkyl group of 1 to 10 carbon atoms, a cycloalkyl group of 5 to 10 carbon atoms, or an aryl group of 6 to 20 carbon atoms,

R_{2b} and R_{2c} are each independently an alkyl group of 1 to 20 carbon atoms, an alkenyl group of 2 to 20 carbon atoms, an alkynyl group of 2 to 20 carbon atoms, a heteroalkyl group of 1 to 20 carbon atoms, a heteroalkenyl group of 2 to 20 carbon atoms, a heteroalkynyl group of 2 to 20 carbon atoms, a cycloalkyl group of 5 to 20 carbon atoms, or an aryl group of 6 to 20 carbon atoms, and

R_{2e} is an alkyl group of 1 to 10 carbon atoms, an allyl group of 2 to 10 carbon atoms, a mono-substituted, di-substituted or tri-substituted alkylsilyl group with alkyl groups of 1

to 10 carbon atoms, a heterocyclic group of 2 to 10 carbon atoms, or -N-[R_{2f}-$Si(OR_{2g})_d(R_{2h})_{3-d}]_2$, where

R_{2f} is a single bond, a substituted with a substituent or unsubstituted alkylene group of 1 to 20 carbon atoms; a substituted with a substituent or unsubstituted cycloalkylene group of 5 to 20 carbon atoms; or a substituted with a substituent or unsubstituted arylene group of 6 to 20 carbon atoms, where the substituent is an alkyl group of 1 to 10 carbon atoms, a cycloalkyl group of 5 to 10 carbon atoms, or an aryl group of 6 to 20 carbon atoms,

R_{2g} and R_{2h} are each independently an alkyl group of 1 to 20 carbon atoms, an alkenyl group of 2 to 20 carbon atoms, an alkynyl group of 2 to 20 carbon atoms, a heteroalkyl group of 1 to 20 carbon atoms, a heteroalkenyl group of 2 to 20 carbon atoms, a heteroalkynyl group of 2 to 20 carbon atoms, a cycloalkyl group of 5 to 20 carbon atoms, or an aryl group of 6 to 20 carbon atoms,

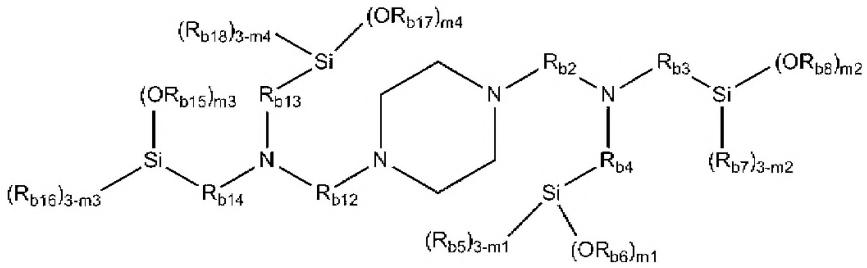
d is an integer of 1 to 3,

a is an integer of 1 to 3, b is 0 or 1, and c is 2 or 3, where

in the case where b is 0, and in the case where b is 1, and R_{2e} is not -N-[R_{2f}-$Si(OR_{2g})_d(R_{2h})_{3-d}]_2$, a+c is 5 or 6, and

in the case where b is 1, and R_{2e} is -N-[R_{2f}-$Si(OR_{2g})_d(R_{2h})_{3-d}]_2$, a+c is 4 or 5,

[Formula 3]



in Formula 3,

R_{b2} to R_{b4} are each independently an alkylene group of 1 to 10 carbon atoms,

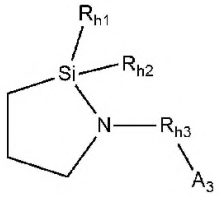
R_{b5} to R_{b8} are each independently an alkyl group of 1 to 10 carbon atoms,

R_{b12} to R_{b14} are each independently an alkylene group of 1 to 10 carbon atoms,

R_{b15} to R_{b18} are each independently an alkyl group of 1 to 10 carbon atoms, and

m_1, m_2, m_3 and m_4 are each independently an integer of 1 to 3,

[Formula 4]



in Formula 4,

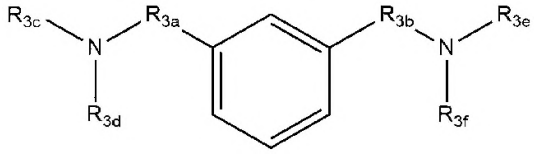
R_{h1} and R_{h2} are each independently an alkyl group of 1 to 10 carbon atoms or an alkoxy group of 1 to 10 carbon atoms,

R_{h3} is a single bond or an alkylene group of 1 to 10 carbon atoms, and A_3 is -

$N[Si(R_{h4}R_{h5}R_{h6})]_2$, where R_{h4} to R_{h6} are each independently an alkoxy group of 1 to 10 carbon atoms.

7. The modified conjugated diene-based polymer of claim 1, wherein the aminoepoxy-based modifier is a compound represented by the following Formula 5 to Formula 7:

[Formula 5]

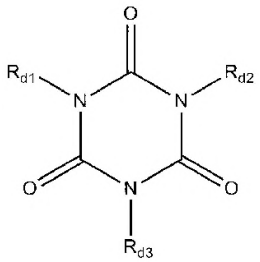


in Formula 5,

R_{3a} and R_{3b} are each independently an alkylene group of 1 to 10 carbon atoms, and

R_{3c} to R_{3f} are each independently hydrogen, an alkyl group of 1 to 10 carbon atoms or $-R_{3g}R_{3h}$, where at least one among R_{3c} to R_{3f} is $-R_{3g}R_{3h}$, R_{3g} is a single bond or an alkylene group of 1 to 10 carbon atoms, which includes or excludes a heteroatom, and R_{3h} is an alkoxysilyl group of 1 to 10 carbon atoms or an epoxy group,

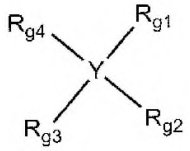
[Formula 6]



in Formula 6,

R_{d1} to R_{d3} are each independently hydrogen, an alkyl group of 1 to 10 carbon atoms or $-R_{d4}R_{d5}$, where at least one among R_{d1} to R_{d3} is $-R_{d4}R_{d5}$, R_{d4} is an alkylene group of 1 to 10 carbon atoms, which includes or excludes a heteroatom, and R_{d5} is an epoxy group,

[Formula 7]



in Formula 7,

R_{g1} to R_{g4} are each independently hydrogen, an alkyl group of 1 to 10 carbon atoms, an alkoxy group of 1 to 10 carbon atoms, an aryl group of 6 to 12 carbon atoms or $-R_{g5}OR_{g6}$, where at least one among R_{g1} to R_{g4} is $-R_{g5}OR_{g6}$, R_{g5} is a single bond or an alkylene group of 1 to 10 carbon atoms, and R_{g6} is an epoxyalkyl group of 3 to 10 carbon atoms, and

Y is C or N, in the case where Y is N, R_{g4} is not present.

8. The modified conjugated diene-based polymer of claim 1, wherein a weight average molecular weight is 1,000,000 g/mol to 3,000,000 g/mol, and molecular weight distribution is 1.0 to 2.0.

9. The modified conjugated diene-based polymer according to claim 1, wherein each of the Si content and the N content is 70 ppm or more based on a total weight of the polymer.

10. A rubber composition comprising the modified conjugated diene-based polymer of claim 1, and a filler.

11. The rubber composition of claim 10, comprising 100 parts by weight of the modified conjugated diene-based polymer and 0.1 parts by weight to 200 parts by weight of the filler.