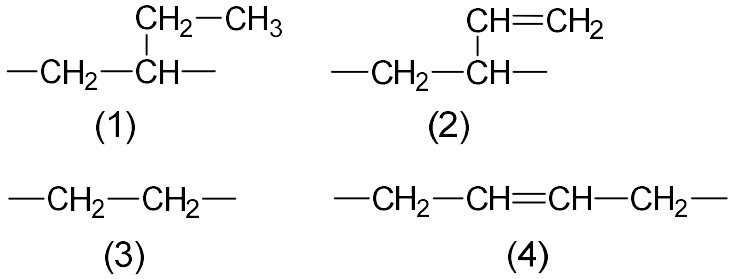
Claims

[Claim 1] A conjugated diene-based polymer comprising a structural unit derived from butadiene and a structural unit derived from an aromatic vinyl compound,

wherein when the proportions by mole of a structural unit represented by formula (1), a structural unit represented by formula (2), a structural unit represented by formula (3), and a structural unit represented by formula (4):

[F1]



in the polymer, are represented by p, q, r, and s, respectively, the value α defined by numerical formula (i):

$\alpha = (p + (0.5\times r))/(p + q + (0.5\times r) + s)$ … (i), is 0.60 to 0.97;

Wherein the relative amount of the structural unit derived from the aromatic vinyl compound is 5 mass% to 50 mass%; and

wherein the value θst, calculated from a ^{1}H-NMR spectrum as measured in deuterated chloroform as a solvent and by numerical formula (ii):

$\theta st = [(\Sigma(a)/\Sigma(a, b))\times 2.5]\times 100$ … (ii)

(wherein $\Sigma(a)$ represents an integral value in a chemical shift range of $6.00 \leq \sigma < 6.89$, and $\Sigma(a,b)$ represents an integral value in a chemical shift range of $6.00 \leq \sigma \leq 8.00$), is greater than 4 mass% and less than 27 mass%.

[Claim 2] The conjugated diene-based polymer according to claim 1, comprising a functional group comprising at least one element selected from the group consisting of nitrogen, oxygen, phosphorus, silicon, and sulfur.

[Claim 3] The conjugated diene-based polymer according to claim 1 or 2, comprising a polymer comprising a multi-branch structure with 4 or more molecular chains, in a relative amount of 15 mass% to 75 mass%.

[Claim 4] The conjugated diene-based polymer according to any one of claims 1 to 3, comprising the structural unit derived from an aromatic vinyl compound in a relative amount of 25 mass% to 50 mass%.

[Claim 5] The conjugated diene-based polymer according to any one of claims 1 to 4, wherein the value β represented by numerical formula (iii):

$$\beta = (p + q)/(p + q + (0.5 \times r) + s) \quad \cdots \quad (iii);$$

is 0.05 to 0.70.

[Claim 6] A polymer composition comprising:

the conjugated diene-based polymer according to any one of claims 1 to 5, and

an antioxidant.

[Claim 7] The polymer composition according to claim 6, further comprising a resin.

[Claim 8] The polymer composition according to claim 6 or 7, further comprising an extender oil.

[Claim 9] The polymer composition according to any one of claims 6 to 8, further comprising an inorganic filler.

[Claim 10] The polymer composition according to claim 9, wherein the inorganic filler comprises silica, and

wherein further comprising a silane coupling agent.

[Claim 11] A cross-linked product formed by cross-linking of the polymer composition according to any one of claims 6 to 10.

[Claim 12] A tire comprising a cap tread and a sidewall, wherein one or both of them is formed from a cross-linked product of the polymer composition according to any one of claims 6 to 10.