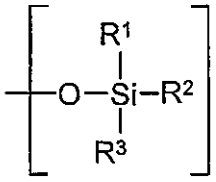
Patent claims

1. Polymers functionalized by terminal groups, characterized in that the polymers have a trialkylsilyloxy group of the formula (I)



(I)

at the end of the chain, where R^1, R^2, and R^3 can be identical or different and are alkyl, cycloalkyl, and aralkyl moieties which can comprise heteroatoms such as O, N, S, and Si.

2. Polymers functionalized by terminal groups, according to Claim 1, characterized in that all of the moieties R are identical.

3. Polymers functionalized by terminal groups, according to Claim 2, characterized in that the moieties R are n-alkyl substituents, preferably methyl groups.

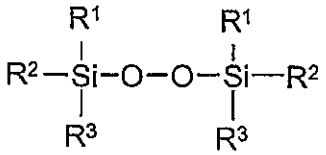
4. Polymers functionalized by terminal groups, according to Claim 3, characterized in that the polymers have terminal hydroxy groups, where these are obtainable via hydrolysis of the terminal groups of the formula (I).

5. Polymers functionalized by terminal groups, according to Claim 1 or 4, characterized in that the polymers are diene polymers or are diene copolymers obtainable via copolymerization of dienes with vinylaromatic monomers.

6. Polymers functionalized by terminal groups, according to Claim 5, characterized in that the diene polymer is a polybutadiene, a polyisoprene, a butadiene-isoprene copolymer, a butadiene-styrene copolymer, an isoprene-styrene copolymer or a butadiene-isoprene-styrene terpolymer.

7. Polymers functionalized by terminal groups, according to Claim 6, characterized in that one or more bis(trialkylsilyl) peroxides are used as functionalization reagent.

8. Polymers functionalized by terminal groups, according to Claim 7, characterized in that the bis(trialkylsilyl) peroxides are compounds of the general formula (II)



(II)

where R^1, R^2, and R^3 can be identical or different and are alkyl, cycloalkyl, and aralkyl moieties which can comprise heteroatoms such as O, N, S, and Si.

9. Polymers functionalized by terminal groups, according to Claim 8, characterized in that all of the moieties R are n-alkyl substituents, preferably methyl groups.

10. Polymers functionalized by terminal groups, according to Claim 9, characterized in that the average (number average) molar masses of the polymers are from 10 000 to 2 000 000 g/mol, preferably from 100 000 to 1 000 000 g/mol.

11. Polymers functionalized by terminal groups, according to Claim 10, characterized in that the glass transition temperatures of the polymers are from -110°C to +20°C, preferably from -110°C to 0°C.

12. Polymers functionalized by terminal groups, according to Claim 11, characterized in that the Mooney viscosities [ML 1+4 (100°C)] of the polymers are from 10 to 200 Mooney units, preferably from 30 to 150 Mooney units.

13. Use of bis(trialkylsilyl) peroxides as functionalization reagents for producing polymers functionalized by terminal groups, according to Claim 1 or 4.

14. Process for producing polymers functionalized by terminal groups, characterized in that one or more bis(trialkylsilyl) peroxides (functionalization reagents) are added to polymers having reactive polymer chain ends.

15. Process according to Claim 14, characterized in that the addition of the functionalization reagents takes place after conclusion of the polymerization process.

16. Process according to Claim 14, characterized in that an excess of functionalization reagents is used.

17. Process according to Claim 14, characterized in that stoichiometric amounts or a sub-stoichiometric amount of functionalization reagents is used.

18. Process according to Claim 15, 16 or 17, characterized in that the amount of functionalization reagents is from 0.005 – 2% by weight, preferably from 0.01 – 1% by weight, based on the amount of polymer having reactive polymer chain ends.

19. Process according to any of the preceding claims, characterized in that coupling reagents are added for the reaction with the reactive polymer chain ends.

20. Use of polymers functionalized by terminal groups, according to any of the preceding claims, for producing vulcanizable rubber compositions.

21. Vulcanizable rubber compositions according to Claim 20, characterized in that they comprise antioxidants, oils, fillers, rubbers and/or rubber auxiliaries.

22. Vulcanizable rubber compositions comprising polymers functionalized by terminal groups having terminal groups of the formula (I) or having terminal hydroxy groups produced therefrom.

23. Use of the vulcanizable rubber compositions according to Claim 22 for producing tyres, in particular tyre treads.

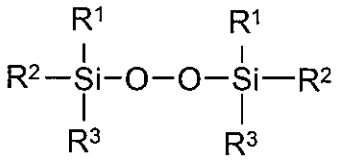
24. Use of the vulcanizable rubber compositions according to Claim 22 for producing mouldings, in particular cable sheathing, hoses, drive belts, conveyer belts, roll coverings, shoe soles, sealing rings and damping elements.

25. Tyres obtainable according to Claim 23.

26. Mouldings obtainable according to Claim 24.

CLAIMS

1. Process for producing polymers functionalized by terminal groups, characterized in that the process is an anionic solution polymerization and one or more bis(trialkylsilyl) peroxides as functionalization reagents according to the general formula (II)



(II)

where R^1, R^2, and R^3 can be identical or different and are alkyl, cycloalkyl, and aralkyl moieties which can comprise heteroatoms such as O, N, S, and Si are added in the form of pure substance, solution or suspension to polymers having reactive polymer chain ends,

wherein the polymer is a polybutadiene, a butadiene-isoprene copolymer, a butadiene-styrene copolymer, an isoprene-styrene copolymer or a butadiene-isoprene-styrene terpolymer.

2. Process according to Claim 1, characterized in that the addition of the functionalization reagents takes place after conclusion of the polymerization process.

3. Process according to Claim 1, characterized in that an excess of functionalization reagents is used.

4. Process according to Claim 1, characterized in that stoichiometric amounts or a sub-stoichiometric amount of functionalization reagents is/are used.

5. Process according to Claim 2, 3 or 4, characterized in that the amount of functionalization reagents is from 0.005 – 2% by weight, based on the amount of polymer having reactive polymer chain ends.

6. Process according to any of the preceding claims, characterized in that coupling reagents selected from the group consisting of silicon tetrachloride, methyltrichlorosilane, dimethyldichlorosilane, tin tetrachloride, dibutyltin dichloride, tetraalkoxysilanes, ethylene glycol diglycidyl ether and 1,2,4-tris(chloromethyl)benzene are added for the reaction with the reactive polymer chain ends.

7. Process according to claim 1 characterized in that the temperature after the addition of coupling reagents is 70°C.

8. Process according to Claim 2, 3 or 4, characterized in that the amount of functionalization reagents is from 0.01 – 1% by weight, based on the amount of polymer having reactive polymer chain ends.