R^2	represents hydrogen, straight-chain or branched alkyl group having 1 to 18 carbon atoms;
R^3	represents hydrogen, hydroxyl group, straight-chain or branched alkyl group having 1 to 4 carbon atoms, or an C_6-C_{14}-aryl group;
L	is a single bond or bivalent group -NH-, -C(O)NH-, -NHC(O)NH-, -OC(O)NH- or -CH_2-;
R^4, R^5 and R^6	independent of one another, represent hydrogen, straight-chain or branched alkyl group having 1 to 8 carbon atoms or a polydimethylsiloxane residue having terminal groups of H and OH; and
R^7	represents hydrogen or methyl group.

In another aspect, there is provided the use of a composition as described herein, to enhance the scratch resistance of the organic polymer.

In another aspect, there is provided an article prepared from the composition as described herein, wherein the article is a molded article or an extruded article.

As used herein, “n” represents the degree of polymerization of the polyacrylate block (A) of the polyacrylate-polysilane block copolymer of formula (I). In a preferred embodiment, n is in a range of from 10 to 3000, more preferably from 50 to 2500, most preferably from 100 to 1000.

As used herein “m” represents the degree of polymerization of the polysilane block (B) of the polyacrylate-polysilane block copolymer of formula (I). In a preferred embodiment, m is in a range of 10 to 3000, more preferably from 50 to 2500, most preferably from 100 to 1000.

Preferred R^1 groups include hydrogen, methyl, ethyl, propyl, isopropyl, butyl, iso-butyl, more preferred are hydrogen, methyl and ethyl.

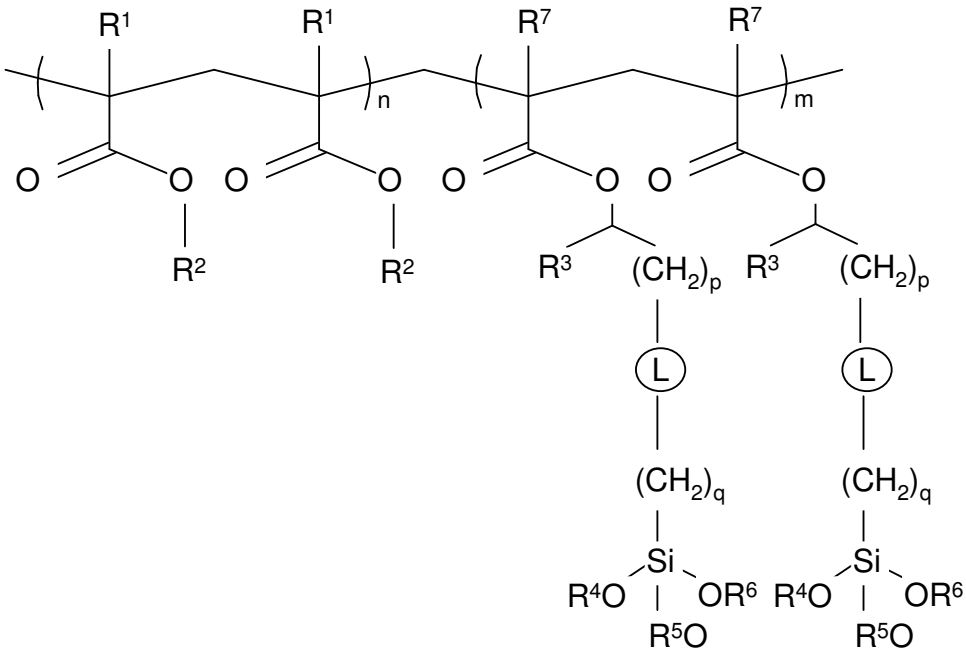
Preferred R^2 groups include hydrogen, methyl, ethyl, propyl, isopropyl, butyl, iso-butyl, more preferred are hydrogen, methyl and ethyl. In one particularly preferred embodiment, R^1 is hydrogen and R^2 is hydrogen. In another particularly preferred embodiment, R^1 is methyl and R^2 is hydrogen.

Preferably, p is an integer ranging from 0 to 3, more preferably p is 0 or 1, most preferred p is 0.

Patent claims

1. A composition comprising:

a polyacrylate-polysilane block copolymer of formula (I) and an organic polymer which is different from the block copolymer of formula (I):



(I)

wherein

m and n	independent of one another, are integers ranging from 2 to 4000;
p	is an integer ranging from 0 to 5;
q	is an integer ranging from 1 to 5;
R^1	represents hydrogen, straight-chain or branched alkyl group having 1 to 4 carbon atoms;
R^2	represents hydrogen, straight-chain or branched alkyl group having 1 to 18 carbon atoms;
R^3	represents hydrogen, hydroxyl group, straight-chain or branched alkyl group having 1 to 4 carbon atoms, or an C_6-C_{14}-aryl group;

L	is a single bond or a bivalent group -NH-, -C(O)NH-, -NHC(O)NH-, -OC(O)NH- or $-CH_2-$;
R^4, R^5 and R^6	independent of one another, represent hydrogen, straight-chain or branched alkyl group having 1 to 8 carbon atoms or a polydimethylsiloxane residue having terminal groups of H and OH; and
R^7	represents hydrogen or methyl group.

2. The composition of claim1, wherein at least one of R^4, R^5 and R^6 represents a polydimethylsiloxane residue.

3. The composition of claim 1, wherein R^3 represents hydrogen, R^7 represents methyl group and wherein at least one of R^4, R^5 and R^6 represents a polydimethylsiloxane residue.

4. The composition of claim 1, wherein L represents methylene ($-CH_2-$) group and wherein at least one of R^4, R^5 and R^6 represents a polydimethylsiloxane residue.

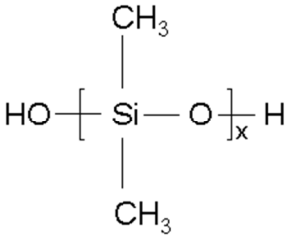
5. The composition of claim 1, wherein L represents amine (-NH-) group, amide (-C(O)NH-) group, urea (-NHC(O)NH-) group, or urethane (-OC(O)NH-) group and wherein at least one of R^4, R^5 and R^6 represents a polydimethylsiloxane residue.

6. The composition as claimed in any of the preceding claims, wherein m is an integer ranging from 100 to 1000; n is an integer ranging from 100 to 1000, p is an integer ranging from 0 to 3 and q is an integer ranging from 1 to 3.

7. The composition as claimed in any of the preceding claims, wherein the weight ratio of the polyacrylate block (A) to the polysilane block (B) is in the range of 1:1.8 x 10^7 to 6204:1.

8. The composition as claimed in any of the preceding claims, wherein the number average molecular weight of the polydimethylsiloxane residue is in the range of 500 g/mole to 300,000 g/mole.

9. The composition as claimed in any of the preceding claims, wherein the polydimethylsiloxane residue has a structure of formula (II):



(II)

wherein x ranges from 6.5 to 4054.

10. The composition as claimed in any of the preceding claims, wherein the organic polymer comprises at least one of polyolefins, polyoxides, polyesters, polystyrene, polylactic acid, cellulose, acrylonitrile-butadiene- styrene (ABS), polyamide, polycarbonate, alkyd resins, amino resins, phenol resins, polyurethane resins, epoxy resins, melamine-urethane-formaldehyde resins, urethane-formaldehyde resins, melamine resins and acrylate resins.

11. The composition of claim 10, wherein the organic polymer is a polypropylene.

12. The composition as claimed in any of the preceding claims, wherein the polyacrylate-polysilane block copolymer is present in the composition in an amount of from 0.5 to 90 % by weight of the total weight of the composition.

13. The composition of claim 12, wherein the polyacrylate-polysilane block copolymer is present in the composition in an amount of from 5 % to 90 %.

14. Use of a composition as claimed in any of the preceding claims, to enhance the scratch resistance of the organic polymer.

15. An article prepared from the composition as claimed in any of the preceding claims, wherein the article is a molded article or an extruded article.

16. The article of claim 15, wherein the article is an automotive part.