Claims

1. A polyalkyl(meth)acrylate for improvement of lubricant oil properties, comprising repeat units derived from (meth)acrylates having 6 to 22 carbon atoms in the alcohol radical, characterized in that the polyalkyl(meth)acrylate is a graft copolymer where the graft base comprises repeat units derived from (meth)acrylates having 6 to 22 carbon atoms in the alcohol radical, and the graft comprises repeat units derived from amine derivatives of a polar ethylenically unsaturated monomer.

~~2. The polyalkyl(meth)acrylate as claimed in claim 1, characterized in that the polymer is a graft copolymer where the graft base comprises repeat units derived from (meth)acrylates having 6 to 22 carbon atoms in the alcohol radical, and the graft comprises repeat units derived from amine derivatives of a polar ethylenically unsaturated monomer.~~

~~3~~2. The polyalkyl(meth)acrylate as claimed in claim 1 ~~or 2~~, characterized in that the polar ethylenically unsaturated monomer from which the amine derivative is derived is maleic acid, maleic anhydride or a maleic acid derivative.

3. The polyalkyl(meth)acrylate as claimed in claim 1, characterized in that the maleic acid derivative is maleic monoester or maleic diester.

4. The polyalkyl(meth)acrylate as claimed in ~~at least one of the preceding claims~~any one of claims 1 to 3, characterized in that the polar ethylenically unsaturated monomer from which the amine derivative is derived is a (meth)acrylate having an epoxide group.

5. The polyalkyl(meth)acrylate as claimed in ~~at least one of the preceding claims~~any one of claims 1 to 4, characterized in that the

amine derivative of a polar ethylenically unsaturated monomer is derived from a primary amine.

6. The polyalkyl(meth)acrylate as claimed in ~~at least one of the preceding claims~~any one of claims 1 to 5, characterized in that the amine derivative of a polar ethylenically unsaturated monomer is derived from an amine which has at least two amino groups, one amino group being a primary amino group and at least one amino group being a secondary amino group.

7. The polyalkyl(meth)acrylate as claimed in claim 6, characterized in that the amine derivative of a polar ethylenically unsaturated monomer is derived from N-phenyl-1,4-phenylenediamine.

8. The polyalkyl(meth)acrylate as claimed in ~~at least one of the preceding claims~~any one of claims 1 to 7, characterized in that the polyalkyl(meth)acrylate has a specific viscosity in the range from 5.5 to ~~35~~25 ml/g at 100°C.

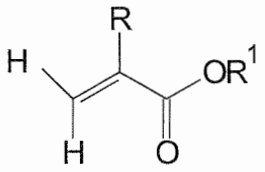
9. The polyalkyl(meth)acrylate as claimed in ~~at least one of the preceding claims~~any one of claims 1 to 8, characterized in that the polyalkyl(meth)acrylate comprises repeat units derived from styrene monomers~~,~~ and/or heterocyclic monomers selected from the group consisting of 2-vinylpyridine, 3-vinylpyridine, 4-vinylpyridine, 2-methyl-5-vinylpyridine, 3-ethyl-4-vinylpyridine, 2,3-dimethyl-5-vinylpyridine, vinylpyrimidine, vinylpiperidine, 9-vinylcarbazole, 3-vinylcarbazole, 4-vinylcarbazole, 1-vinylimidazole, N-vinylimidazole, 2-methyl-1-vinylimidazole, N-vinylpyrrolidone, N-vinylpyrrolidine,

3-vinylpyrrolidine, N-vinylcaprolactam, N-vinylbutyrolactam, vinyloxolane, vinylfuran, vinylthiophene, vinylthiolane, vinylthiazoles, hydrogenated vinylthiazoles, vinyloxazoles and hydrogenated vinyloxazoles~~, vinyl ethers and/or vinyl esters~~.

10. The polyalkyl(meth)acrylate as claimed in claim 9, characterized in that the polyalkyl(meth)acrylate comprises 0.1 to 20% by weight of repeat units derived from styrene monomers~~,~~ and/or heterocyclic monomers selected from the group consisting of 2-vinylpyridine, 3-vinylpyridine, 4-vinylpyridine, 2-methyl-5-vinylpyridine, 3-ethyl-4-vinylpyridine, 2,3-dimethyl-5-vinylpyridine, vinylpyrimidine, vinylpiperidine, 9-vinylcarbazole, 3-vinylcarbazole, 4-vinylcarbazole, 1-vinylimidazole, N-vinylimidazole, 2-methyl-1-vinylimidazole, N-vinylpyrrolidone, N-vinylpyrrolidine, 3-vinylpyrrolidine, N-vinylcaprolactam, N-vinylbutyrolactam, vinyloxolane, vinylfuran, vinylthiophene, vinylthiolane, vinylthiazoles, hydrogenated vinylthiazoles, vinyloxazoles and hydrogenated vinyloxazoles~~, vinyl ethers and/or vinyl esters~~.

11. The polyalkyl(meth)acrylate as claimed in ~~at least one of the preceding claims~~any one of claims 1 to 10, characterized in that the polyalkyl(meth)acrylate comprises

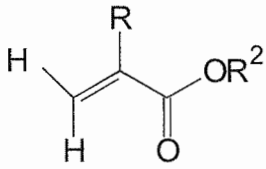
a) 0 to 40% by weight of repeat units derived from (meth)acrylates of the formula (I)



(I)

in which R is hydrogen or methyl and R^1 is an alkyl radical having 1 to 5 carbon atoms,

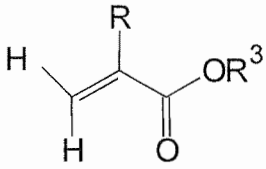
b) 20 to 99.9% by weight of repeat units derived from (meth)acrylates of the formula (II)



(II)

in which R is hydrogen or methyl and R^2 is an alkyl radical having 6 to 22 carbon atoms,

c) 0 to 20% by weight of repeat units derived from (meth)acrylates of the formula (III)



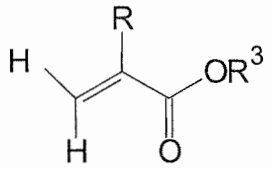
(III)

in which R is hydrogen or methyl and R^3 is an alkyl radical having 23 to 4000 carbon atoms, and

d) 0.1 to 10% by weight of repeat units derived from amine derivatives of a polar ethylenically unsaturated monomer.

12. The polyalkyl(meth)acrylate as claimed in claim 11, characterized in that the polyalkyl(meth)acrylate comprises

0 to 20% by weight of repeat units derived from (meth)acrylates of the formula (III)

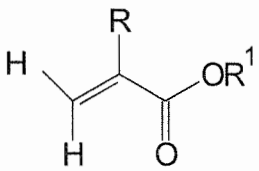


(III)

in which R is hydrogen or methyl and R^3 is an alkyl radical having 23 to 400 carbon atoms.

~~12~~13. The polyalkyl(meth)acrylate as claimed in ~~at least one of the preceding claims~~any one of claims 1 to 12, characterized in that the polyalkyl(meth)acrylate comprises

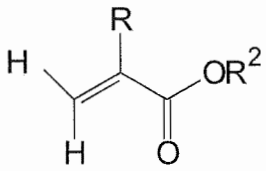
a) 0 to 40% by weight of repeat units derived from (meth)acrylates of the formula (I)



(I)

in which R is hydrogen or methyl and R^1 is an alkyl radical having 1 to 5 carbon atoms,

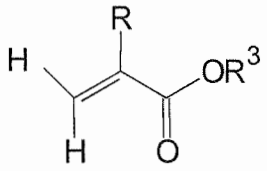
b) 50 to 99.9% by weight of repeat units derived from (meth)acrylates of the formula (II)



(II)

in which R is hydrogen or methyl and R^2 is an alkyl radical having 6 to 22 carbon atoms,

c) 0.5 to 20% by weight of repeat units derived from (meth)acrylates of the formula (III)



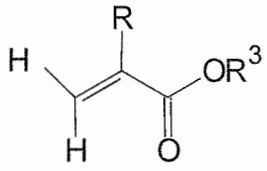
(III)

in which R is hydrogen or methyl and R^3 is an alkyl radical having 23 to 4000 carbon atoms, and

d) 0.1 to 10% by weight of repeat units derived from amine derivatives of a polar ethylenically unsaturated monomer.

14. The polyalkyl(meth)acrylate as claimed in claim 13, characterized in that the polyalkyl(meth)acrylate comprises

0.5 to 20% by weight of repeat units derived from (meth)acrylates of the formula (III)



(III)

in which R is hydrogen or methyl and R^3 is an alkyl radical having 23 to 400 carbon atoms.

~~13~~15. A process for preparing a polyalkyl(meth)acrylate as claimed in ~~at least~~any one of claims 1 to ~~12~~14,

characterized in that ~~(meth)acrylates having 6 to 22 carbon atoms and polar ethylenically unsaturated monomers are polymerized simultaneously or sequentially, and then the resulting polymer is reacted with at least one amine.~~

~~14. The process as claimed in claim 13, characterized in that~~ a graft base is first prepared by polymerizing (meth)acrylates having 6 to 22 carbon atoms, onto which polar ethylenically unsaturated monomers are subsequently grafted.

~~15~~16. A lubricant composition comprising at least one polyalkyl(meth)acrylate as claimed in ~~at least~~any one of claims 1 to ~~12~~14 ~~or obtainable by a process of claim 13 or 14~~.

~~16~~17. The lubricant composition as claimed in claim ~~15~~16, characterized in that the lubricant composition comprises 0.01 to 30% by weight of polyalkyl(meth)acrylate as claimed in ~~at least~~any one of claims 1 to ~~12~~14 ~~or obtainable by a process of claim 13 or 14~~.

~~17~~18. The use of a polyalkyl(meth)acrylate as claimed in ~~at least~~any one of claims 1 to ~~12~~14 ~~or obtainable by a process of claim 13 or 14~~ for reducing friction.