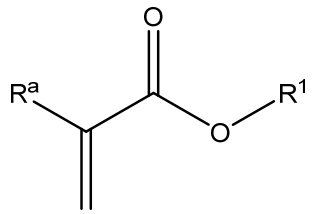
CLAIMS

We claim:

1. A random copolymer obtained from polymerizing an acrylate monomer composition, wherein the monomer composition comprises

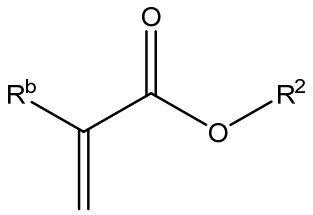
a) from 5 to 55 mole% of at least one short chain acrylate of Formula (I)



(I)

in which R^a is hydrogen or methyl, and R^1 is a linear or branched C_1 to C_{10} alkyl radical;

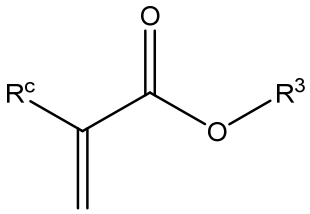
b) from 0 to 75 mole% of at least one long chain acrylate of Formula (II),



(II)

in which R^b is hydrogen or methyl, and R^2 is a linear or branched C_{11} to C_{15}alkyl radical;

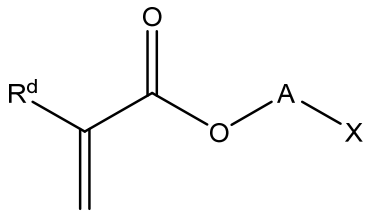
c) from 0 to 75% of at least one long chain acrylate of Formula (III)



(III)

in which R^c is hydrogen or methyl, and R^3 is a linear or branched C_{16} to C_{30} alkyl radical; and

d) from 5 to 50 mole% of at least one polar acrylate of Formula (IV),



(IV)

in which R^d is hydrogen or methyl, A is a linear or branched C_2 to C_6 alkyl radical, aromatic radical, or a polyether of the formula $(–CHR^4CH_2\text{-}O\text{-})_n$ where R^4 is hydrogen or methyl and n is from 1 to 10; and X is COOH or OH;

wherein

at least one of R^a, R^b, R^c, and R^d is methyl;

the long chain acrylate of component b) and component c) together total from 35 mol% to 75 mole% of the acrylate monomers;

the ratio of short chain acrylate to long chain acrylate is from 0.05 to 2; and

the copolymer has an M_n of 1000 to 8,000 g/mol.

2. The random copolymer of claim 1, where each of R^a, R^b, R^c, and R^d is methyl.

3. The random copolymer of claim 1, wherein R^1 is methyl.

4. The random copolymer of claim 1, comprising at least 5 to 45 mole % of the short chain acrylate.

5. The random copolymer of claim 1, wherein M_n is 2,000 to 8,000 g/mol.

6. The random copolymer of claim 1, wherein R^2 is a linear or branched C_{12} to C_{14} alkyl radical, and R^3 is a linear or branched C_{16} to C_{20} alkyl radical.

7. The random copolymer of claim 1, wherein A is a linear or branched C_2 to C_4 alkyl radical or a polyether of the formula $(\text{-}CHR^4CH_2\text{-}O\text{-})_n$ where R^4 is hydrogen or methyl and n=1 to 4.

8. The random copolymer of claim 1, wherein A is a $\text{-}CH_2CH_2\text{-}$.

9. The random copolymer of claim 1, comprising from 10 to 50 mole% of the polar acrylate.

10. The random copolymer of claim 1, comprising from 35 to 70 mole% of the long chain acrylate of component b) and component c) together.

11. The random copolymer of claim 1, wherein the ratio of short chain acrylate to long chain acrylate is 0.3 to 1.5.

12. The random copolymer of claim 1, wherein

R^1 is methyl or butyl;
R^2 is lauryl-myristyl or lauryl;
R^3 is cetyl-eicosyl; and
A-X is 2-hydroxyethyl.

13. The random copolymer of claim 12, wherein the M_n is 2000 to 8,000 and the ratio of short chain acrylate to long chain acrylate is 0.1 to 1.5.

14. The random copolymer of claim 1, wherein:

R^1 is a linear or branched C_1 to C_6 alkyl radical;
R^2 is a linear or branched C_{12} to C_{14} alkyl radical;
R^3 is a linear or branched C_{16} to C_{20} alkyl radical; and
A is a linear or branched C_2 to C_6 alkyl radical.15. The random copolymer of claim 1, wherein each of R^1, R^2, R^3, and A are linear.

16. A lubricating oil composition, comprising:
a base oil, and
at least one additive having friction-modifying properties;

wherein the at least one additive having friction-modifying properties is the random copolymer as claimed in any one of claims 1-14. fo

17. The lubricating oil composition of claim 16, comprising the random copolymer as claimed in claim 14, wherein each of R^1, R^2, R^3, and A are linear