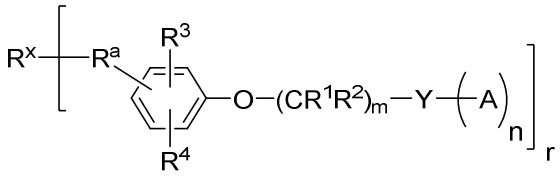
WHAT IS CLAIMED IS:

1. A polyolefin dispersant defined by Formula I below



Formula I

wherein

R^x is an initiator residue;

R^a is a polyolefin group;

R^1 and R^2 are each, independently in each —(CR^1R^2) unit, H, alkyl, alkoxy, or alkylaryl;

R^3 and R^4 are each, independently, H, alkyl, or alkoxy;

m is an integer from 1 to 20;

n is an integer from 1 to 6;

r is an integer from 1 to 4;

Y is a polyvalent amine linker comprising one or more tertiary amines, wherein the polyvalent amine linker does not include a primary amine or a secondary amine; and

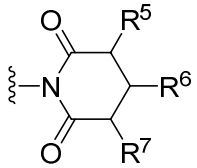
A is absent, or comprises a dispersive moiety.

2. The dispersant of claim 1, wherein A is present.

3. The dispersant of claim 1 or 2, wherein A comprises an imide moiety.

4. The dispersant of claim 3, wherein the imide moiety comprises a cyclic imide.

5. The dispersant of claim 4, wherein the imide moiety comprises a moiety defined by Formula III below

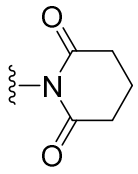


Formula III

wherein

R^5, R^6, and R^7 are each, independently, H, halogen, alkyl, alkoxy, aryl, alkylaryl, or cycloalkyl, or wherein R^5 and R^6, together with the atoms to which they are attached, R^6 and R^7, together with the atoms to which they are attached, or both R^5 and R^6 and R^6 and R^7, together with the atoms to which they are attached, form a 5-8 membered substituted or unsubstituted aromatic or non-aromatic ring.

6. The dispersant of claim 5, wherein the imide moiety comprises one of the following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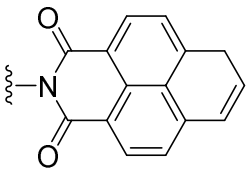
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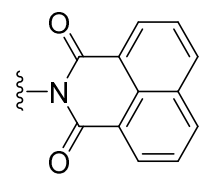
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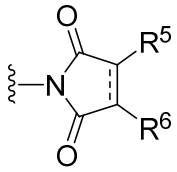
7. The dispersant of claim 4, wherein the imide moiety comprises a moiety defined by Formula IV below

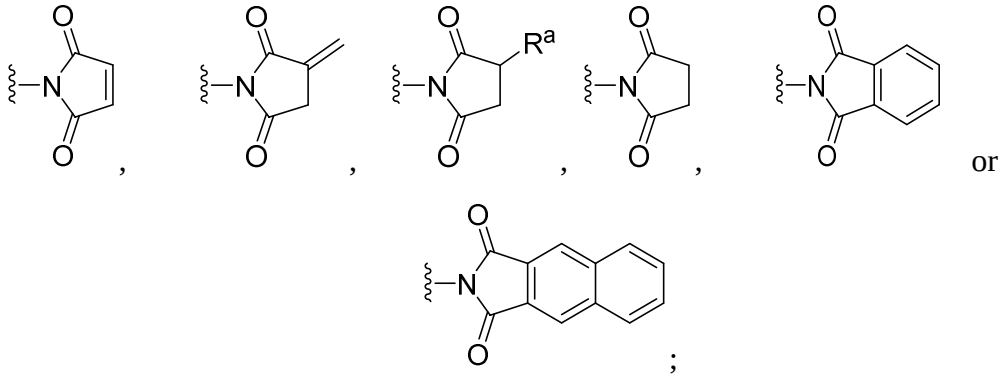


Formula IV

wherein

R^5 and R^6 are each, independently, H, halogen, alkyl, alkoxy, aryl, alkylaryl, or cycloalkyl, or wherein R^5 and R^6, together with the atoms to which they are attached, form a 5-8 membered substituted or unsubstituted aromatic or non-aromatic ring.

8. The dispersant of claim 7, wherein the imide moiety comprises one of the following



wherein R^a is a polyolefin group.

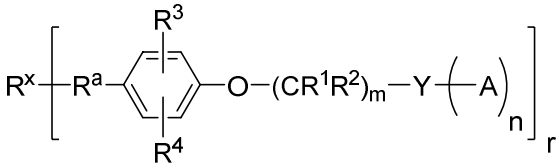
9. The dispersant of any of claims 1-8, wherein R^a comprises a polyisobutylene group.

10. The dispersant of any of claims 1-9, wherein Y comprises from one to three tertiary amines.

11. The dispersant of any of claims 1-10, wherein Y comprises from 6 to 30 carbon atoms.

12. The dispersant of any of claims 1-11, wherein R^1 and R^2 are each, independently H or alkyl.

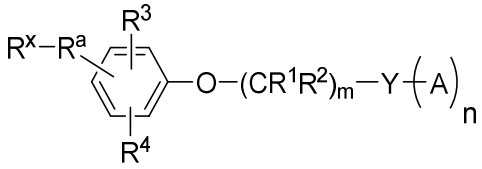
13. The dispersant of any of claims 1-12, wherein the dispersant is defined by Formula IA below



Formula IA

wherein R^x, R^a, R^1, R^2, R^3, R^4, m, n, r, Y, and A are defined as defined above in Formula I.

14. The dispersant of any of claims 1-12, wherein the dispersant is defined by Formula IB below

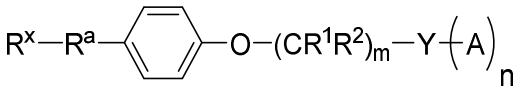


Formula IB

wherein R^x, R^a, R^1, R^2, R^3, R^4, m, n, Y, and A are defined as defined above in Formula I.

15. The dispersant of any of claims 1-14, wherein R^3 and R^4 are both H.

16. The dispersant of claim 14, wherein the dispersant is defined by Formula II below

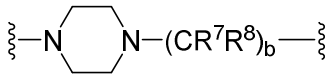


Formula II

wherein R^x, R^a, R^1, R^2 m, n, Y, and A are defined as defined above in Formula I.

17. The dispersant of any of claims 1-16, wherein Y comprises a bivalent amine linker and n is 1.

18. The dispersant of claim 17, wherein Y is defined by the structure below



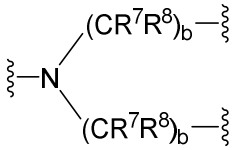
wherein

R^7 and R^8 are each, independently in each —(CR^1R^2) unit, H, alkyl, alkoxy, or alkylaryl; and

b is an integer from 1 to 20.

19. The dispersant of any of claims 1-16, wherein Y comprises a trivalent amine linker and n is 2.

20. The dispersant of claim 19, wherein Y is defined by the structure below



wherein

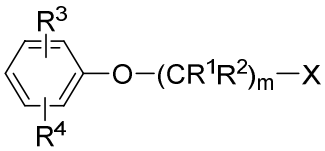
R^7 and R^8 are each, independently in each —(CR^1R^2) unit, H, alkyl, alkoxy, or alkylaryl; and

b is an integer from 1 to 20.

21. A method for preparing a polyolefin dispersant, the method comprising:

(a) generating a quasiliving polyolefin in a reversible deactivation-type living polymerization;

(b) adding to the a reversible deactivation-type living polymerization of step (a) a quenching agent defined by Formula V to generate a phenoxy-quenched precursor;

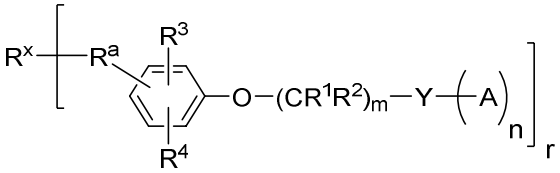


Formula V

wherein R^1, R^2, R^3, R^4, and m are as defined above with respect to Formula I, and X is a leaving group;

(c) reacting the phenoxy-quenched precursor with a polyamine to form a polyamine-capped precursor; and

(d) reacting the polyamine-capped precursor with an anhydride to form the polyolefin dispersant defined by Formula I below



Formula I

wherein

R^x is an initiator residue;

R^a is a polyolefin group;

R^1 and R^2 are each, independently in each —(CR^1R^2) unit, H, alkyl, alkoxy, or alkylaryl;

R^3 and R^4 are each, independently, H, alkyl, or alkoxy;

m is an integer from 1 to 20;

n is an integer from 1 to 6;

r is an integer from 1 to 4;

Y is a polyvalent amine linker comprising one or more tertiary amines, wherein the polyvalent amine linker does not include a primary amine or a secondary amine; and

A is absent, or comprises a dispersive moiety.

22. The method of claim 21, wherein step (a) comprises combining a Lewis acid and a monomer with an initiator in the presence of an electron donor, common ion salt, common ion salt precursor, or combination thereof.

23. The method of claim 22, wherein the initiator is chosen from 2-chloro-2,4,4-trimethylpentane, 1,3-bis(2-chloro-2-propyl)-5-tert-butylbenzene, 1,3,5-tri(2-chloro-2-propyl)benzene, 1,3,5-tri(2-methoxy-2-propyl)benzene, and 2,6-dichloro-2,4,4,6-tetramethylheptane.

24. The method of claims 22 or 23, wherein the monomer is isobutylene.

25. The method of any of claims 22-24, wherein step (b) is performed after high conversion of the monomer has occurred.

26. The method of any of claims 21-25, wherein X is chosen from a chloro group, an iodo group, a bromo group, a triflate group, or a mesylate group.

27. The method of any of claims 21-26, wherein the polyamine comprises a protected polyamine, and wherein step (c) comprises reacting the phenoxy-quenched precursor with the protected polyamine to form a protected polyamine-capped precursor, and deprotecting the protected polyamine-capped precursor to form the polyamine-capped precursor.

28. The method of any of claims 21-27, wherein the polyamine comprises 1-(2-aminoethyl)piperazine, diethylenetriamine, N-methyl-1,3-diaminopropane, triethylenetetramine

(TETA), triethylenepentamine (TEPA), pentaethylenehexamine (PEHA), hexaethyleneheptamine (HEHA), N-phenyl-p-phenylenediamine, or N-benzylethylenediamine.

29. The method of any of claims 21-28, wherein the anhydride comprises a cyclic anhydride.

30. The method of any of claims 21-29, wherein the anhydride comprises a dianhydrides or a polycyclic anhydride.