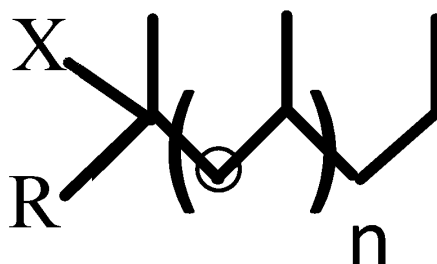


CLAIMS

1. A hydroxyaromatic product comprising:
an alkyl hydroxyaromatic compound having a structure given by



wherein R is a hydroxyaromatic group, X is hydrogen or methyl group and wherein n is 1 or greater.

2. The hydroxyaromatic product of claim 1, wherein R is a phenol group, a hydroxybenzyl group, catechol group, resorcinol group, hydroquinone group, pyrogallol group, cresol group, naphthol group, hydroxybenzoic acid group or a salt thereof.
3. The hydroxyaromatic product of claim 1, wherein n is 20 or less.
4. The hydroxyaromatic product of claim 1, wherein n is between 2 and 6.
5. The hydroxyaromatic product of claim 1, wherein at least 50 mol % of alkyl hydroxyaromatic compound have an alkyl group having an NMR branching index of 45% or greater.
6. The hydroxyaromatic product of claim 1, wherein at least 50 mol % of the alkyl group of the alkyl hydroxy aromatic compound have an alkyl group having a ratio of methyl carbon to methylene carbon of greater than about 0.85.

7. The hydroxyaromatic product of claim 1, wherein at least 50 mol % of the alkyl hydroxy aromatic compound have an alkyl group having a ratio of methyl carbon to methylene carbon and methine carbon of greater than about 0.29.
8. The hydroxyaromatic product of claim 1, wherein at least 50 mol % of the alkyl hydroxyaromatic compound have an alkyl group having a ratio of methyl-branch surrounded methylene carbon resonances in 44-49 PPM range as measured in chloroform to combined saturated aliphatic carbon resonances in 10-50 ppm resonances as measured in chloroform of more than 0.15.
9. A lubricating oil composition comprising:
 - a base oil; and
 - a hydroxyaromatic product of claim 1.
10. An alkyl-substituted hydroxyaromatic compound formed by a process comprising:
 - alkylating a hydroxyaromatic compound with an alkylating agent containing vinylidene-rich propylene oligomers comprising propylene oligomers that terminate with vinylidene double bond, wherein the propylene oligomers are prepared by oligomerizing a propylene-rich feedstock containing olefins wherein at least 50 mol % of the olefins in the feedstock are propylene and wherein at least 50 mol % of the propylene oligomers have the vinylidene double bond.
11. The alkyl-substituted hydroxyaromatic composition of claim 10, wherein the hydroxyaromatic compound is phenol, catechol, resorcinol, hydroquinone, pyrogallol, cresol, naphthol, or hydroxybenzoic acid.
12. The alkyl-substituted hydroxyaromatic composition of claim 10, wherein at least 80 mol % of the olefins in the feedstock are propylene.

13. The alkyl-substituted hydroxyaromatic composition of claim 10, wherein the propylene-rich feedstock is prepared by fluid catalytic cracking and oligomerized without prior separation of propane and propylene.
14. The alkyl-substituted hydroxyaromatic composition of claim 10, wherein at least 70 mol % of the propylene oligomers have the vinylidene double bond.
15. The alkyl-substituted hydroxyaromatic composition of claim 10, wherein at least 80 mol % of propylene oligomers have the vinylidene double bond.
16. The alkyl-substituted hydroxyaromatic composition of claim 10, wherein the propylene oligomers have an average carbon number ranging from about 9 to about 50.
17. The alkyl-substituted hydroxyaromatic composition of claim 10, wherein at least 50 mol % of the alkyl group of alkyl hydroxy aromatic compound have an NMR branching index of 45% or greater.
18. The alkyl-substituted hydroxyaromatic composition of claim 10, wherein at least 50 mol % of the alkyl group of the alkyl hydroxy aromatic compound have a ratio of methyl carbon to methylene carbon of greater than about 0.85.
19. The alkyl-substituted hydroxyaromatic composition of claim 10, wherein at least 50 mol % of the alkyl group of the alkyl hydroxy aromatic compound have a ratio of methyl carbon to methylene carbon and methine carbon of greater than about 0.29.

20. The alkyl-substituted hydroxyaromatic composition of claim 10, wherein at least 50 mol % of the composition have an alkyl group with at least 5 carbons.

21. The alkyl-substituted hydroxyaromatic composition of claim 10, wherein at least 50 mol % of the alkyl group of the alkyl hydroxyaromatic compound have a ratio of methyl-branch surrounded methylene resonances in 44-49 PPM range as measured in chloroform to combined saturated aliphatic carbon resonances in 10-50 ppm resonances as measured in chloroform of more than 0.15.

22. A lubricating oil composition comprising:

a base oil; and

a detergent derived from sulfurized alkylphenol, wherein the alkylphenol is made via alkylation with an alkylating agent containing vinylidene-rich propylene oligomers comprising propylene oligomers that terminate with vinylidene double bond, wherein the propylene oligomers are prepared by oligomerizing a propylene-rich feedstock containing olefins wherein at least 50 mol % of the olefins in the feedstock are propylene and wherein at least 50 mol % of the propylene oligomers have the vinylidene double bond.

23. The lubricating oil composition of claim 22, wherein at least 70 mol % of the olefins in the feedstock are propylene.

24. The lubricating oil composition of claim 22, wherein the propylene-rich feedstock has an olefin to alkane molar ratio ranging from about 10/1 to about 1/10.

25. The lubricating oil composition of claim 22, wherein the propylene-rich feedstock is isolated from a catalytic or thermal cracking process with a propylene to propane ratio within 5% as produced in the catalytic cracking process without separation of propane and propylene.

26. The lubricating oil composition of claim 22, wherein at least 80 mol % of the olefins in the propylene-rich feedstock are propylene.

27. The lubricating oil composition of claim 22, wherein least 70 mol % of the propylene oligomers have the vinylidene double bond.

28. The lubricating oil composition of claim 22, wherein at least 80 mol % of the propylene oligomers have the vinylidene double bond.

29. The lubricating oil composition of claim 22, wherein the propylene oligomers have an average carbon number ranging from about 9 to about 50.

30. A method of alkylating a hydroxyaromatic compound comprising:
oligomerizing propylene monomers in presence of single-site catalyst to form vinylidene-rich propylene oligomers comprising propylene oligomers that terminate with vinylidene double bond, wherein the propylene oligomers are prepared by oligomerizing a propylene-rich feedstock containing olefins wherein at least 50 mol % of the olefins in the feedstock are propylene and wherein at least 50 mol % of the propylene oligomers have the vinylidene double bond; and
alkylating the hydroxyaromatic compound with the vinylidene-rich propylene oligomers.

31. The method of claim 30, wherein the single-site catalyst is a metallocene.

32. The method of claim 30, wherein the metallocene has a general formula $(\text{RCp})_2\text{MX}_2$ wherein Cp is a cyclopentadienyl group and RCp is a substituted cyclopentadienyl group wherein R is an alkyl group or hydrogen, M is Ti, Zr or Hf and X is Cl, Br, I, H, Me, or Et.

33. The method of claim 30, wherein the propylene oligomers are prepared by oligomerizing a propylene-rich feedstock containing olefins wherein at least 80 mol % of the olefins in the feedstock are propylene.
34. The method of claim 30, wherein at least 80 mol % of the propylene oligomers have the vinylidene double bond.
35. The method of claim 30, wherein the hydroxyaromatic compound is phenol, catechol, resorcinol, hydroquinone, pyrogallol, cresol, hydroxybenzoic acid or a salt thereof.