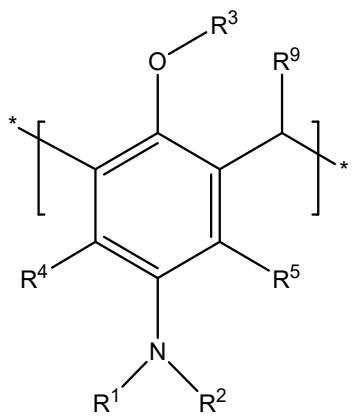
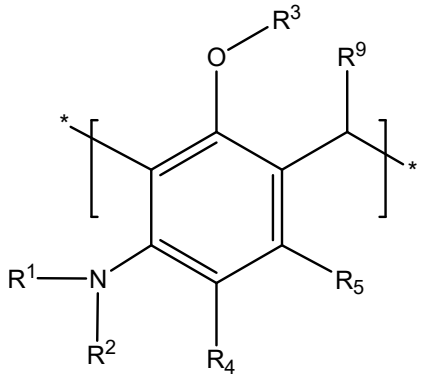
WHAT IS CLAIMED IS:

1. A polymer comprising a repeat unit having the structure of formula I, formula II, or a combination thereof,



I



II

wherein R^1 and R^2 are $-(CR^6R^7)_n(CHOH)(CH_2)_p(O)_qR^8$; R^3 is H, alkyl, aryl, benzyl, or aralkyl; R^4 and R^5 are independently H, or C_1-C_{22} alkyl, -OH, or NR_1R_2; R^6 and R^7 are independently H or alkyl; R^8 is C_1-C_{24} linear, branched, or cyclic alkyl, aryl, or aralkyl; R^9 is H, alkyl, aryl, benzyl, or aralkyl, optionally substituted with an alkyl group, alkoxy group, or hydroxyl group; n is an integer between 1 and 12; p is 0 or an integer between 1 and 12; and q is 0 or 1.

2. The polymer of claim 1 wherein R^3 is H.

3. The polymer of claim 1 or claim 2 wherein R^4 and R^5 are H.

4. The polymer of any one of claims 1 to 3 wherein R^6 and R^7 are H.

5. The polymer of any one of claims 1 to 4 wherein R^9 is H.

6. The polymer of any one of claims 1 to 5 wherein n, p, and q are 1.

7. The polymer of any one of claims 1 to 6 wherein R^8 is n-octyl, isooctyl, n-decyl, isodecyl, n-hexyl, n-butyl, or 2-ethylhexyl.

8. The polymer of any one of claims 1 to 7 comprising 1-100 of the repeat units.

9. The polymer of any one of claims 1 to 8 further comprising an additional repeat unit comprising the condensation product of a phenolic compound and an aldehyde.

10. The polymer of claim 9 wherein the phenolic compound is phenol, resorcinol, pyrocatechol, hydroquinone, phloroglucinol, hydroxyhydroquinone, or a mixture of two or more thereof.

11. The polymer of claim 9 or claim 10 wherein the aldehyde is formaldehyde, acetaldehyde, benzaldehyde, vanillin, salicylaldehyde, glyoxal, glyoxylic acid, or a mixture of two or more thereof.

12. The polymer of any one of claims 1-11 wherein the polymer excludes repeat units having the structure of formula II.

13. A composition comprising the polymer of any one of claims 1 to 12 and a solvent selected from toluene, heavy aromatic naphtha, xylenes, a glycol, water, an alcohol, ethylene glycol, ethylene glycol monobutyl ether, kerosene, propylene carbonate, a glycol ether, or any combination thereof.

14. The composition of claim 13 further comprising one or more corrosion inhibitors, viscosity reducers, friction reducers, scale inhibitors, clay swelling inhibitors, biocides, dispersants, flow back aids, emulsifiers, emulsion breakers, hydrogen sulfide scavengers, hydrate inhibitors, pH modifiers, or surfactants.

15. The composition of claim 13 or claim 14 wherein the composition comprises 5 wt% to 99.9 wt% of the polymer.

16. A method of preventing fouling in an industrial process stream, wherein the industrial process stream is a crude oil process stream or comprises one or more polymerizable species, the method comprising adding 0.1 ppm to 10,000 ppm of a polymer of any one of claims 1 to 12 or a composition of any one of claims 13-15 to the industrial process stream.

17. A treated industrial process stream comprising a mixture of

a polymer of any one of claims 1 to 12 or a composition of any one of claims 13-15; and

an industrial process stream comprising a foulant, wherein the industrial process stream is a crude oil process stream or comprises one or more polymerizable species.

18. The treated industrial process stream of claim 17 wherein the foulant comprises an asphaltene or a wax.

19. An industrial process system comprising the treated industrial process stream of claim 17 or claim 18 disposed within the system and in fluid contact with a surface therein.

20. Use of a polymer of any one of claims 1 to 12 or a composition of any one of claims 13-15 as an antifoulant in an industrial process stream, wherein the industrial process stream is a crude oil process stream or comprises one or more polymerizable species.