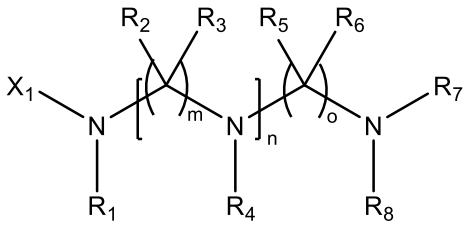
WHAT IS CLAIMED IS:

1. A method of inhibiting corrosion at a surface, the method comprising contacting the surface with a corrosion-inhibiting effective amount of a polyamine compound of formula 1 or 2, the polyamine compound of formula 1 or 2 having the structure:



(1)

wherein

X_1 is $–C(O)R_9$ or $–[C(R_{10}R_{11})]_p-C(R_{12})(X_2)-R_{13}$;

X_2 is –OH or $–NH_2$;

R_1 and R_4 are independently hydrogen, alkyl, or $–[C(R_{10}R_{11})]_p-C(R_{12})(X_2)-R_{13}$;

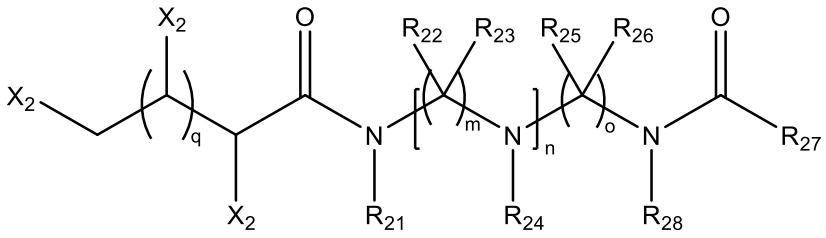
R_2, R_3, R_5, R_6, R_7, R_8, R_{10}, R_{11}, and R_{12} are independently hydrogen or alkyl;

R_9 and R_{13} are independently C_7 to C_{30} alkyl or alkenyl;

m and o are integers from 1 to 10;

n is an integer from 1 to 6; and

p is an integer from 1 to 10;



(2)

wherein

X_2 is –OH or $–NH_2$;

R_{21}, R_{22}, R_{23}, R_{24}, R_{25}, R_{26}, and R_{28} are independently hydrogen or alkyl;

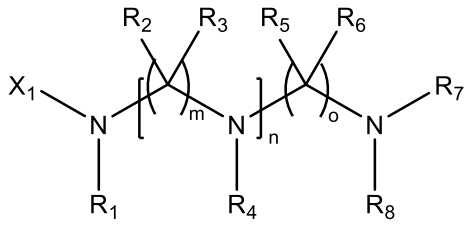
R_{27} is C_{10} to C_{30} alkyl or alkenyl;

m and o are integers from 1 to 10;

n is an integer from 1 to 6; and

q is an integer from 0 to 10.

2. Use of a corrosion-inhibiting effective amount of a polyamine compound of formula 1 or 2 for inhibiting corrosion at a surface, the polyamine compound of formula 1 or 2 having the structure:



(1)

wherein

X_1 is –C(O)R_9 or –[C($R_{10}R_{11}$)]$_p$-C(R_{12})(X_2)-R_{13};

X_2 is –OH or –NH_2;

R_1 and R_4 are independently hydrogen, alkyl, or –[C($R_{10}R_{11}$)]$_p$-C(R_{12})(X_2)-R_{13};

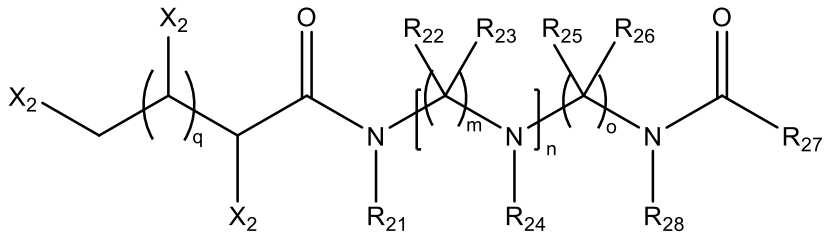
R_2, R_3, R_5, R_6, R_7, R_8, R_{10}, R_{11}, and R_{12} are independently hydrogen or alkyl;

R_9 and R_{13} are independently C_7 to C_{30} alkyl or alkenyl;

m and o are integers from 1 to 10;

n is an integer from 1 to 6; and

p is an integer from 1 to 10;



(2)

wherein

X_2 is –OH or –NH_2;

R_{21}, R_{22}, R_{23}, R_{24}, R_{25}, R_{26}, and R_{28} are independently hydrogen or alkyl;

R_{27} is C_{10} to C_{30} alkyl or alkenyl;

m and o are integers from 1 to 10;

n is an integer from 1 to 6; and

q is an integer from 0 to 10.

3. The method or use of claim 1 or 2, wherein the polyamine compound has a structure of Formula 1.

4. The method or use of any one of claims 1 to 3, wherein X_1 is –C(O)R_9.

5. The method or use of any one of claims 1 to 3, wherein X_1 is $–[C(R_{10}R_{11})]_p-C(R_{12})(X_2)-R_{13}$.

6. The method or use of any one of claims 1 to 5, wherein R_1 and R_4 are independently hydrogen or $–[C(R_{10}R_{11})]_p-C(R_{12})(X_2)-R_{13}$.

7. The method or use of any one of claims 1 to 6, wherein R_9 and R_{13} are independently C_7 to C_{20} alkyl or alkenyl.

8. The method or use of any one of claims 1 to 7, wherein R_2, R_3, R_5, R_6, R_7, R_8, R_{10}, R_{11}, and R_{12} are independently hydrogen, methyl, or ethyl.

9. The method or use of claim 8, wherein R_2, R_3, R_5, R_6, R_7, R_8, R_{10}, R_{11}, and R_{12} are hydrogen.

10. The method or use of any one of claims 1 to 9, wherein X_2 is –OH.

11. The method or use of claim 10, wherein m is an integer from 2 to 3.

12. The method or use of any one of claims 1 to 11, wherein n is an integer from 2 to 4.

13. The method or use of any one of claims 1 to 12, wherein o is an integer from 2 to 3.

14. The method or use of any one of claims 1 to 13, wherein p is an integer from 1 to 4.

15. The method or use of claim 1 or 2, wherein the polyamine compound has a structure of Formula 2.

16. The method or use of claim 15, wherein X_2 is –OH.

17. The method or use of any one of claims 1, 15, and 16, wherein R_{21}, R_{22}, R_{23}, R_{24}, R_{25}, R_{26}, and R_{28} are independently hydrogen, methyl, or ethyl.

18. The method or use of any one of claims 1, and 15 to 17, wherein m is an integer of 2 or 3.

19. The method or use of any one of claims 1, and 15 to 18, wherein n is an integer of 2 or 3.

20. The method or use of any one of claims 1, and 15 to 19, wherein o is an integer of 2 or 3.

21. The method or use of any one of claims 1, and 15 to 20, wherein q is an integer of 0, 1 or 2.

22. The method or use of any one of claims 1 to 21, where the polyamine compound of formula 1 or 2 is added to a fluid that contacts the surface and the surface is a metal surface.

23. The method or use of any one of claims 1 to 22, wherein the surface is part of a piece of equipment in an oil and gas refinery or petroleum plant and the piece of equipment is in an amine unit, a crude distillation unit, or a fluid catalytic cracking unit.

24. The method or use of any one of claims 1 to 23, wherein the polyamine compound of Formula 1 or 2 forms a film on the surface or passivates the surface.

25. The method or use of any one of claims 1 to 24, wherein the polyamine compound of Formula 1 or 2 is contacted with the surface at a concentration from 1 ppm to 1000 ppm of the active ingredient based on the weight of refinery stream being treated.