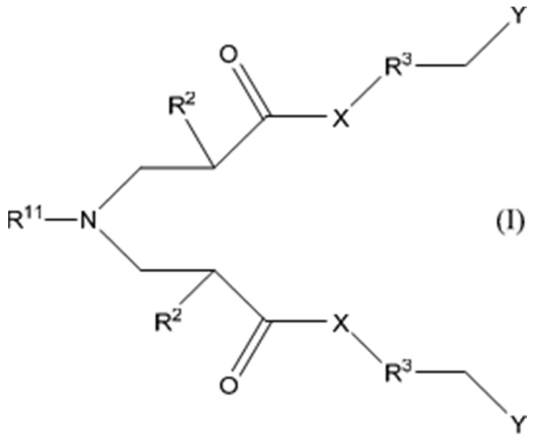
What is claimed is:

1. A compound according to Formula I



Wherein:

X is NH or O;

R^{11} is R^1 or R^1-Z-$(CH_2)_m$-;

R^1 is an unsubstituted or substituted, linear or branched C_1-C_{30} alkyl, cyclic alkyl, alkenyl, or alkynyl group;

Z is NH or O;

R^2 is H, CH_3, or an unsubstituted, linear or branched C_2-C_{10} alkyl, alkenyl, or alkynyl group;

m is an integer of 1 to 4;

R^3 is absent or an unsubstituted, linear C_1-C_{30} alkylene group;

Y is -$NR^4R^5R^{6(+)}$, or a salt thereof; and

R^4, R^5, and R^6 are independently a C_1-C_{10} alkyl group.

2. The compound according to claim 1, wherein Y is – $NR^4R^5R^{6(+)}$, wherein R^4 and R^5 are independently CH_3, and wherein R^6 is CH_3, a C_2-C_{12} aromatic alkyl, or -CH_2-C_6H_6.

3. The compound according to any one of claims 1 to 2, wherein Y is –$NR^4R^5R^{6(+)}$ and the counter ion for Y is chloride, bromide, fluoride, iodide, acetate, aluminate, cyanate, cyanide, dihydrogen phosphate, dihydrogen phosphite, formate, carbonate, hydrogen carbonate, hydrogen oxalate, hydrogen sulfate, hydroxide, nitrate, nitrite, thiocyanate, or a combination thereof.

4. The compound according to any one of claims 1 to 3, wherein R^3 is CH_2, CH_2CH_2,

$C(CH_3)_2$, or an unsubstituted, linear, and saturated or unsaturated C2-C10 alkylene group.

5. The compound according to any one of claims 1 to 4, wherein R^1 is a linear C_1-C_{30} alkyl, alkenyl, or alkynyl group, a branched C_3-C_{30} alkyl, alkenyl, or alkynyl group, a linear or branched saturated C_1-C_{30} alkyl group, a linear C_1-C_{30} alkenyl group with one or more double bonds, a branched C_3-C_{30} alkenyl group with one or more double bonds, or a linear or branched C_2-C_{30} alkynyl group with one or more triple bonds.

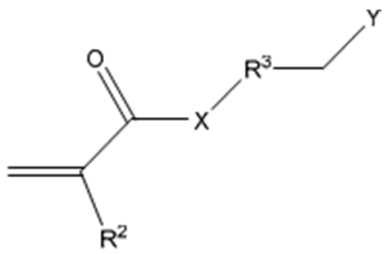
6. The compound according to any one of claims 1 to 4, wherein R^{11} is a linear and saturated C_2-C_{20} alkyl group, a C_2-C_{20} alkenyl group with at least one *trans* double bond, a C_2-C_{20} alkenyl group with at least one *cis* double bond, or R^1-NH- $CH_2CH_2CH_2$ and R^1 is a linear saturated C_2-C_{20} alkyl, trans alkenyl, or a cis alkenyl group.

7. The compound according to any one of claims 1-6, wherein R^2 is H, X is NH, R^3 is CH_2CH_2, and Y is CH_2-$N^+(CH_3)_3Cl^-$.

8. A method to synthesize a compound comprising:

contacting a primary amine with an activated olefin to generate the compound of any one of claims 1 to 7;

wherein the primary amine is R^{11}-NH_2, wherein R^{11} is R^1 or R^1-Z-$(CH_2)_m$-; and wherein the activated olefin is



X is NH or O;

R^{11} is R^1 or R^1-Z-$(CH_2)_m$-;

R^1 is an unsubstituted or substituted, linear or branched C_1-C_{30} alkyl, cyclic alkyl, alkenyl, or alkynyl group;

Z is NH or O;

R^2 is H, CH_3, or an unsubstituted, linear or branched C_2-C_{10} alkyl, alkenyl, or alkynyl group;

m is an integer of 1 to 4;

R^3 is absent or an unsubstituted, linear C_1-C_{30} alkylene group; Y is $-NR^4R^5R^{6(+)}$, or a salt thereof; and

R^4, R^5, and R^6 are independently a C_1-C_{10} alkyl group.

9. The method of claim 8, wherein the contacting step is done in the presence of a reaction solvent, of a reaction solvent and alkalinity source, of a reaction solvent and acid, or of a reaction solvent and a catalyst, wherein the reaction solvent is water, methanol, ethanol, propanol, glycol, PEG, or a mixture thereof.

10. The method according to claim 9, wherein the contacting step is done in the presence of a catalyst, base, or a combination thereof.

11. The method according to claim 9, wherein the contacting step is done without the presence of a catalyst, base, or acid.

12. The method according to any one of claims 9 to 10, wherein the contacting step is done in the presence of a hydroxide, alkali metal hydroxide, alkaline metal hydroxide, metal carbonate, imidazole, pyridine-based base, amidine base, guanidine base, or combinations thereof.

13. The method according to any one of claims 9 to 10, wherein the contacting step is done in the presence of benzyltrimethylammonium hydroxide.

14. An article, product, or composition comprising one or more compounds of any one of claims 1-13.

15. The article, product, or composition of claim 14, wherein the article, product or composition further comprises a carrier solvent, water, a surfactant, or combinations thereof.

16. The article, product, or composition of claim 15, wherein the carrier solvent is water, an alcohol, an alkylene glycol, an alkyleneglycol alkyl ether, or a combination thereof.

17. The article, product, or composition of any one of claims 15-16, wherein the carrier solvent is methanol, ethanol, propanol, isopropanol, butanol, isobutanol, monoethyleneglycol, ethyleneglycol monobutyl ether, or a combination thereof.

18. The article, product, or composition of any one of claims 14-17, wherein the article, product or composition further comprises a primary alkalinity source and is a detergent composition, wherein the primary alkalinity source is an alkali metal hydroxide, alkali metal carbonate, alkali metal silicate, alkali metal metasilicate,

alkanoamine, amine, or mixture thereof.

19. The article, product, or composition of claim 18, wherein the article, product, or composition further comprises a builder, an enzyme, a chelant, a surfactant, one or more additional detergent composition agents, or a combination thereof.

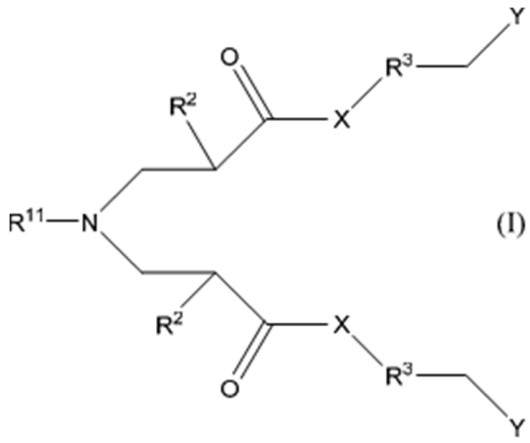
20. The article, product, or composition of claim 19, wherein the enzyme is a protease enzyme, wherein the chelant is methylglycinediacetic acid (MGDA), glutamic acid-N,N-diacetic acid (GLDA), N- hydroxyethylaminodiacetic acid, ethylenediaminetetraacetic acid (EDTA), hydroxyethylenediaminetetraacetic acid, diethylenetriaminepentaacetic acid, N- hydroxyethyl-ethylenediaminetriacetic acid (HEDTA), diethylenetriaminepentaacetic acid (DTPA), ethylenediaminesuccinic acid (EDDS), 2-hydroxyethyliminodiacetic acid (HEIDA), iminodisuccinic acid (IDS), 3-hydroxy-2-2′-iminodisuccinic acid (HIDS), or mixture thereof, and/or wherein the surfactant is a nonionic, semi-nonionic, cationic, anionic, amphoteric, zwitterionic, Gemini, surfactant or mixtures thereof.

21. The article, product, or composition of any one of claims 18-20, wherein the composition is a solid, a multiple use solid, or multiple use pressed solid composition.

22. A method of for inhibiting corrosion at a surface in a water system comprising:

providing a corrosion control composition or a use solution of the corrosion control composition into a water system to generate a treated water system or onto to a surface of the water system,

wherein the corrosion control composition comprises one or more compounds according to one of Formula I, Formula II, Formula III and one or more additional corrosion control composition agents,



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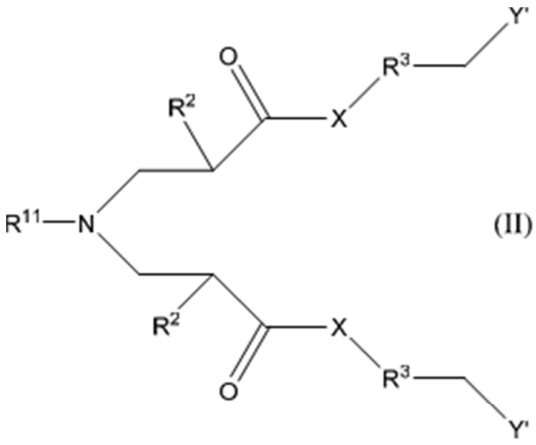


(II)



(III)

wherein:

X is NH or O;

R^{11} is R^1 or R^1-Z-$(CH_2)_m$-;

R^1 is an unsubstituted or substituted, linear or branched C_5-C_{30} alkyl, cyclic alkyl, alkenyl, or alkynyl group;

Z is NH or O;

R^2 is H, CH_3, or an unsubstituted, linear or branched C_2-C_{10} alkyl, alkenyl, or alkynyl

group;

m is an integer of 1 to 4;

R^3 is absent or an unsubstituted, linear C_1-C_{30} alkylene group;

Y is $-NR^4R^5R^{6(+)}$;

Y' is -COOH, $-SO_3H$, $-PO_3H$, $-OSO_3H$, $-OPO_3H$, or a salt thereof; and

R^4, R^5, and R^6 are independently a C_1-C_{10} alkyl group;

$R^{2'}$ is H, CH_3, or an unsubstituted or substituted, linear or branched C_1-C_{10} alkyl, alkenyl, alkynyl group, -COOH, $-CH_2COOH$, Y', or $-(CH_2)_m$-Y' and

wherein the corrosion control composition mitigates corrosion on the surface in the water system.

23. The method according to claim 22, wherein Y is $-NR^4R^5R^{6(+)}$, $N(CH_3)_3^+$, or $N(CH_3)_2R^{6+}$, and wherein R^6 is a C_2-C_{12} alkyl. aryl, or is $-CH_2$-C_6H_6.

24. The method according to any one of claims 22-23, wherein R^3 is CH_2, CH_2CH_2, or $C(CH_3)_2$, or an unsubstituted and linear C_2-C_{10} alkylene group.

25. The method according to any one of claims 22-24, wherein R^{11} is a C_6-C_{20} alkenyl group with at least one *trans* or *cis* double bond.

26. The method according to any one of claims 22-25, wherein the corrosion control composition agent is water, an organic solvent, a surfactant, one or more additional corrosion inhibitors, a scale inhibitor, gas hydrate inhibitor, pH modifier, an emulsion breaker, reverse emulsion breaker, a fouling control agent, coagulant/flocculant agent, an emulsifier, a water clarifier, a dispersant, antioxidant, polymer degradation prevention agent, permeability modifier, foaming agent, antifoaming agent, emulsifying agent, scavenger agent for CO_2, and/or O_2, gelling agent, lubricant, friction reducing agent, salt, or any mixture thereof.

27. The method according to any one of claims 22-25, wherein the corrosion control composition agent is a biocide, wherein the biocide is chlorine, hypochlorite, ClO_2, bromine, ozone, hydrogen peroxide, peracetic acid, peroxysulphate, peroxycarboxylic acid composition, glutaraldehyde, dibromonitrilopropionamide, isothiazolone, terbutylazine, polymeric biguanide, methylene bisthiocyanate, tetrakis hydroxymethyl phosphonium sulphate, or any combination thereof.

28. The method according to any one of claims 22-25, wherein the corrosion control composition agent is an acid and wherein the corrosion control composition comprises

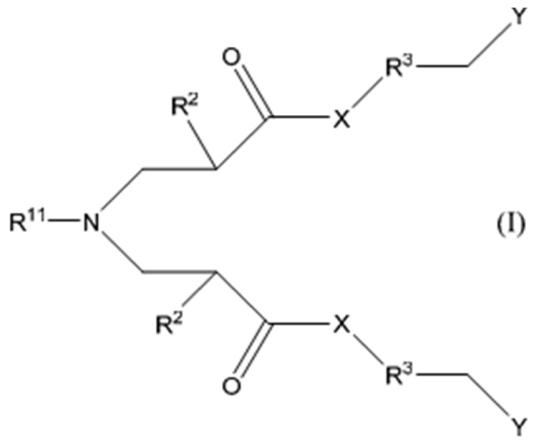
from about 1 wt-% to about 20 wt-% of the acid, wherein the acid is hydrochloric acid, hydrofluoric acid, citric acid, formic acid, acetic acid, or a mixture thereof.

29. The method according to any one of claims 22-28, wherein the corrosion control composition is a liquid, gel, or a mixture comprising liquid/gel and solid, and wherein the corrosion control composition or a use solution thereof has a pH of from about 1 to about 11.

30. The method according to any one of claims 22-29, wherein the corrosion control composition comprises from about 10 wt-% to about 80 wt-% of the compound and has a concentration of from about 1 ppm to about 1000 ppm in the treated water system.

31. The method according to any one of claims 22-30, wherein the water system is a cooling water system, boiler water system, water system in oil and gas operations, in a petroleum well, downhole formation, geothermal well, mineral washing, flotation and benefaction, papermaking, gas scrubber, air washer, continuous casting processes in the metallurgical industry, air conditioning and refrigeration, water reclamation, water purification, membrane filtration, food processing, clarifiers, municipal sewage treatment, municipal water treatment, or potable water system, and wherein the water system comprises fresh water, recycled water, salt water, surface water, produced water, oil, hydrocarbon, solid, or mixture thereof.

32. A corrosion control composition comprising one or more compounds according to one of Formula I, Formula II, and Formula III and one or more additional corrosion control composition agents,



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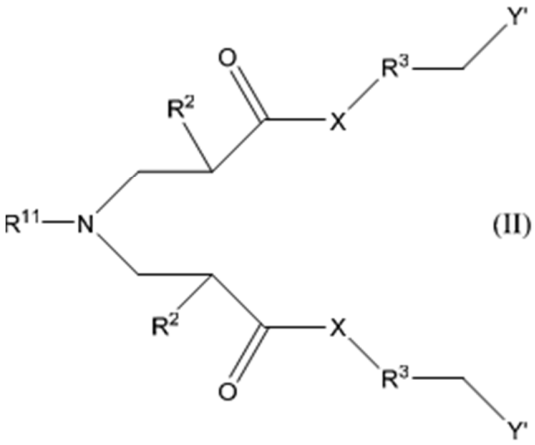

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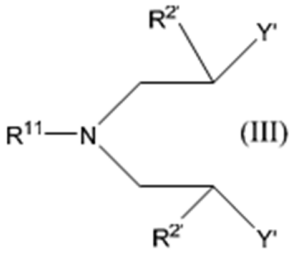

(III)

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R^4, R^5, and R^6 are independently a C_1-C_{10} alkyl group;

$R^{2'}$ is H, CH_3, or an unsubstituted or substituted, linear or branched C_1-C_{10} alkyl,

alkenyl, alkynyl group, -COOH, $-CH_2COOH$, Y', or $-(CH_2)_m$-Y', and

wherein the corrosion control composition mitigates corrosion on the surface in the water system.