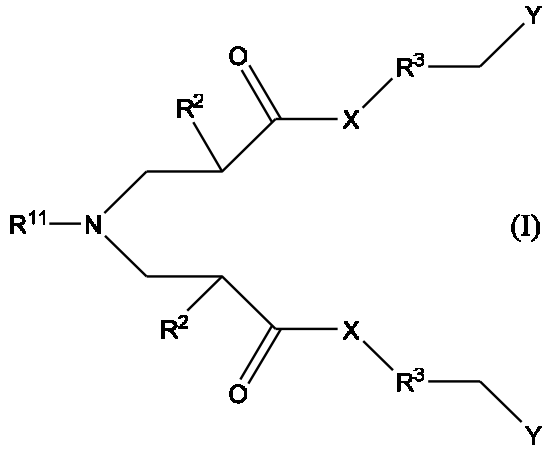
inhibitors, foaming agents, floatation collectors, dispersants, surfactants assisted enhanced oil recovery (EOR), cleaners, etc.

In one aspect, a compound according to Formula I is provided:



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_1-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, or $C(CH_3)_2$;

Y is $-NR_4R_5R_6^{(+)}$, CH_2-$N^+(CH_3)_3$, or a salt thereof; and

R^4 and R^5 are independently C_1-C_{10} alkyl group, and R^6 is a C_1-C_{10} alkyl, C_2-C_{12} aromatic alkyl, or -CH_2-C_6H_5.

In other aspect, disclosed herein is a method to synthesize the disclosed compounds. The method comprises contacting a primary amine with an activated olefin containing at least one cationic group to generate any compound disclosed herein; wherein the primary amine is R^{11}-NH_2, R^{11} is R^1 or R^1-Z-$(CH_2)_m$-; the activated olefin is

C_1-C_{10} alkyl group, and wherein the corrosion control composition mitigates corrosion on the surface in the water system.

In some embodiments, the corrosion control composition can mitigate corrosion on a metal surface to about 280 mpy, about 265, about 250 mpy, about 225 mpy, about 200 mpy, about 175 mpy, about 150 mpy, about 175 mpy, about 100 mpy, or any value there between, when the di-cation or di-anionic compound is at about 2 ppm and corrosion rate is measured by a bubble test.

In some embodiments, the one or more compounds are one or more of Formula **I**. In some other embodiments, the one or more compounds are one or more of Formula **II**. In yet some other embodiments, the one or more compounds are one or more of Formula **III**. In some other embodiments, the one or more compounds are one or more of Formula **II** and Formula **III**.

In some embodiments of the disclosed compounds herein, X is NH. In some other embodiments, X is O.

In some embodiments, R^{11} is R^1. In some other embodiments, R^{11} is R^1-Z-$(CH_2)_m$-. In some embodiments, R^{11} is R^1-Z-$(CH_2)_m$-, and Z is NH. In some other embodiments, R^{11} is R^1-Z-$(CH_2)_m$-, and Z is O. In yet some other embodiments, R^{11} is R^1-Z-$(CH_2)_m$-, Z is NH, m is 2.

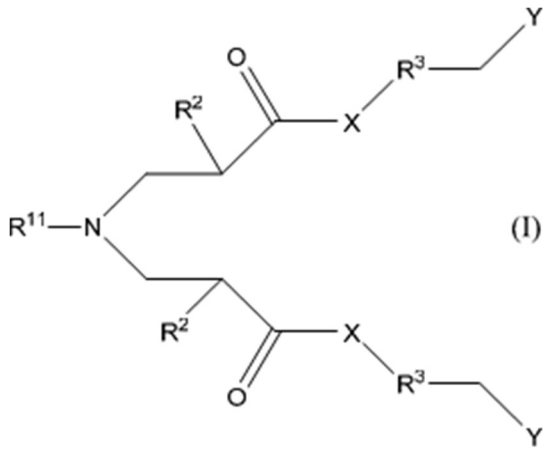
In some embodiments, R^2 is H. In some embodiments, R^2 is CH_3. In yet some other embodiments, R^2 is CH_3CH_3, $CH_2CH_2CH_3$, or $CH(CH_3)_2$.

In some embodiments, Y is -$NR_4R_5R_6^{(+)}$. In some other embodiments, Y is -$NR_4R_5R_6^{(+)}$, and R^4, R^5, and R^6 are independently CH_3. In yet some other embodiments, Y is -$NR_4R_5R_6^{(+)}$, and R^4 and R^5, independently CH_3, and R^6 is a C_2-C_{12} aromatic alkyl. In some other embodiments, Y is -$NR_4R_5R_6^{(+)}$, and R^4 and R^5, independently CH_3, and R^6 is -CH_2-C_6H_5.

In some embodiments, Y is -$NR_4R_5R_6^{(+)}$ and the counter ion for Y any negative charged ion or species. In some other embodiments, 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.

What is claimed is:

1. A compound according to Formula I



Wherein:

X is NH or O;

R^{11} is 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, or $C(CH_3)_2$;

Y is -$NR^4R^5R^{6(+)}$, CH_2-$N^+(CH_3)_3$, or a salt thereof; and

R^4 and R^5 are independently a C_1-C_{10} alkyl group, and R^6 is a C_1-C_{10} alkyl, C_2-C_{12} aromatic alkyl, or -CH_2-C_6H_5.

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_5.

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 C_2-C_{10} 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 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-$N^+(CH_3)_3Cl^-$.