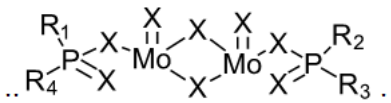
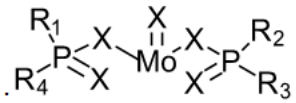
WHAT IS CLAIMED IS:

1. A method of inhibiting corrosion of a metal containment in a crude oil refining process wherein the metal containment comprises an acidic fluid source containing crude oil or a fraction thereof and acidic corrodents, comprising:

introducing into the acidic fluid source at least one molybdenum-containing complex having the formula selected from Formula I, II, III, or IV; wherein the acidic fluid source has a temperature in the range of 175°C to 600°C; wherein the acidic corrodents comprise a naphthenic acid and sulfur in the form of hydrogen sulfide, an organic sulfide, a mercaptan, or sulfur dioxide and wherein each of Formula I, II, III or IV is given by the following:

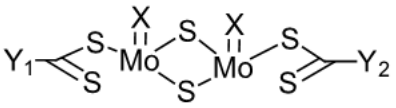


Formula I

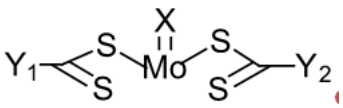


Formula II

wherein R_1, R_2, R_3, and R_4, are each a hydrocarbon group and wherein R_1, R_2, R_3, and R_4 can be the same or different; and X is oxygen or sulfur and X can be the same or different.



Formula III



Formula IV

wherein Y^1 and Y^2 are each oxygen, nitrogen or carbon-containing ligand and Y^1 and Y^2 can be the same or different and X is each oxygen or sulfur, and X can be the same of different from each other.

2. The method as in claim 1, wherein the acidic fluid source is in contact with a distillation column, a stripper, a tray, or piping.

3. The method as in one of claims 1-2, wherein the acidic fluid source comprises at least a liquid hydrocarbon fraction.

4. The method of claim 3, wherein the hydrocarbon fraction is a distillate.

5. The method as in one of claims 1-4, wherein the corrodents comprise at least naphthenic acid, sulfur or combinations thereof.

6. The method as in one of claims 1-5, wherein the acidic fluid source comprises a TAN of 0.2 to 20.

7. The method as in one of claims 1-6, wherein the molybdenum-containing complex is added to the acidic fluid source in an amount from 1 ppm to 3,000 ppm.

8. The method as in one of claims 1-7, wherein the R_1, R_2, R_3, and R_4 of formulae I and II comprise thiophosphates, phosphates and polymers thereof.

9. The method as in one of claims 1-8, wherein the Y^1 and Y^2 of formulae III and IV comprise thiocarbamates and polymers thereof.

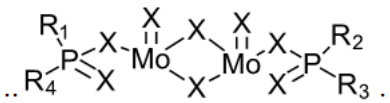
10. The method as in one of claims 1-9, wherein the molybdenum-containing complex comprises a molybdenum dithiocarbamate, dithiophosphate, polymers thereof and combinations thereof.

11. The method of claim 10, wherein the molybdenum-containing complex comprises a molybdenum dithiocarbamate,and wherein the molybdenum dithiocarbamate is an alkyldithiocarbamate.

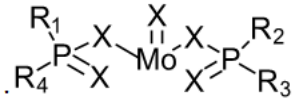
12. The method of claim 11, wherein the alkyldithiocarbamate is an ethyl hexyl dithiocarbamate.

13. The method of claim 10, wherein the molybdenum-containing complex comprises a molybdenum dithiophosphate, and wherein the molybdenum dithiophosphate is an alkyldithiophosphate.

14. A composition comprising an acidic fluid source comprising a crude oil or a fraction thereof, said acidic fluid source containing acidic corrodents and at least one corrosion-inhibiting molybdenum-containing complex, wherein the acidic fluid source has a temperature in the range of 175°C to 600°C; wherein the acidic corrodents comprise a naphthenic acid and sulfur in the form of hydrogen sulfide, an organic sulfide, a mercaptan, or sulfur dioxide and wherein the at least one molybdenum-containing complex comprises a formula selected from Formula I, II, II or IV:

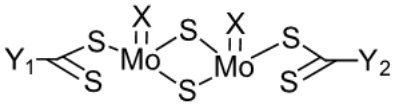


Formula I

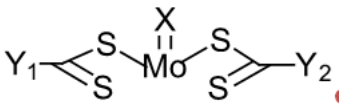


Formula II

wherein R_1, R_2, R_3, and R_4, are each a hydrocarbon group and wherein R_1, R_2, R_3, and R_4 can be the same or different; and X is oxygen or sulfur and X can be the same or different.



Formula III



Formula IV

wherein Y^1 and Y^2 are each oxygen, nitrogen or carbon-containing ligands and Y^1 and Y^2 can be the same or different and X is each oxygen or sulfur, and X can be the same of different from each other.

15. The composition of claim 14, wherein the composition further comprises one or more, asphaltene inhibitors, paraffin inhibitors, dispersants, emulsion breakers, or any combination thereof.

16. The composition as in one of claims 14-15, wherein the acidic fluid source is in contact in with a distillation column, a stripper, a tray, or piping.

17. The composition as in one of claims 14-16, wherein the acidic fluid source comprises at least a liquid hydrocarbon fraction.

18. The composition as in one of claims 14-17, wherein the hydrocarbon fraction is a distillate.

19. The composition as in one of claims 14-18, wherein the corrodents comprise at least naphthenic acid, sulfur or combinations thereof.

20. The composition as in one of claims 14-19, wherein the molybdenum-containing complex comprises a molybdenum dithiocarbamate, dithiophosphate, polymers thereof and combinations thereof.

21. The composition of claim 20, wherein the molybdenum-containing complex comprises a molybdenum dithiocarbamate,and wherein the molybdenum dithiocarbamate is an alkyldithiocarbamate.

22. The composition of claim 21, wherein the alkyldithiocarbamate is an ethyl hexyl dithiocarbamate.

23. The composition of claim 20, wherein the molybdenum-containing complex comprises a molybdenum dithiophosphate,and wherein the molybdenum dithiophosphate is an alkyldithiophosphate.

24. The composition as in one of claims 14-23, wherein the composition comprises 1 ppm to 3,000 ppm of the at least one corrosion-inhibiting molybdenum-containing complex.

25. A treated metal containment comprising:

a metal containment comprising a metal surface; and the composition as in one of claims 14-24,

wherein at least a portion of the metal surface is contacted by the composition.