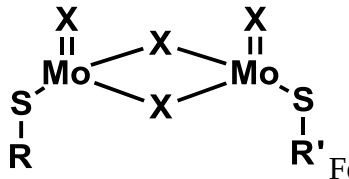
WHAT IS CLAIMED IS:

1. A method of inhibiting corrosion of a metal surface that is contacted by a hydrocarbon fluid source containing acidic corrodents, comprising:

introducing into the hydrocarbon fluid source containing acidic corrodents a phosphorus-free, sulfur-containing molybdenum complex having the general formula selected from Formula II:



Formula II

wherein R and R' each represents a group selected from an alkyl group comprising one or more hydroxyl groups, an alkyl group, an alkenyl group, or an aryl group; and each X represents oxygen or sulfur and can be the same or different but where at least one X in Formula II is sulfur.

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

3. The method as in claim 1 or 2, wherein the hydrocarbon fluid source comprises 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, 2 or 3, wherein the acidic corrodents comprise naphthenic acid, sulfur or combinations thereof.

6. The method as in one of claims 1-5, wherein the hydrocarbon fluid source comprises a total acid number (TAN) of 0.2 to 20.

7. The method as in one of claims 1, 2, or 3-6, wherein the hydrocarbon fluid source has a temperature that is in a range from 175°C to 600°C.

8. The method of claim 1, wherein R or R' comprises one or more hydroxy groups.

9. The method of claim 1, wherein R or R' comprises an alkyl group.

10. The method of claim 1, wherein R or R' comprises an alkenyl group.

11. The method of claim 1, wherein R or R' comprises an aryl group.

12. The method of claim 11, wherein the aryl group is substituted.

13. The method of claim 9, wherein the alkyl group comprises 2 to 30 carbon atoms.

14. The method of claim 9, wherein the alkyl group comprises 5 to 10 carbon atoms.

15. The method of claim 1, wherein the acidic corrodent comprises a naphthenic acid.

16. The method of claim 1, wherein the hydrocarbon fluid source comprises crude oil.

17. The method of claim 1, wherein the phosphorus-free, sulfur-containing molybdenum complex is introduced into a distillation column.

18. The method of claim 1, wherein the introducing step comprises introducing a composition into the hydrocarbon fluid source, wherein the composition comprises the phosphorus-free, sulfur-containing molybdenum complex and one or more other additives.

19. The method of claim 18, wherein the one or more other additives comprise an asphaltene inhibitor.

20. The method of claim 18, wherein the one or more other additives comprise a paraffin inhibitor.

21. The method of claim 18, wherein the one or more other additives comprise a dispersant.