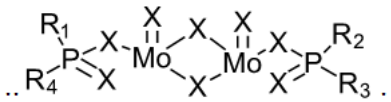
What is claimed is:

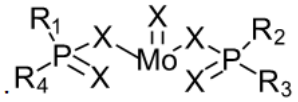
1. A method of inhibiting deposition of a foulant comprising:

a) prior to introducing a hydrocarbon feedstock comprising one or more foulants into process equipment comprising a surface, pre-passivating the process equipment to provide treated, pre-passivated process equipment, said pre-passivating comprising contacting the surface with a passivating composition to pre-passivate the surface, said composition comprising

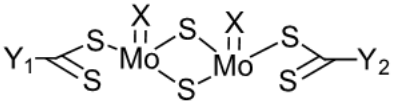
at least one molybdenum-containing complex having a formula selected from the group consisting of Formula I, II, III, or IV,



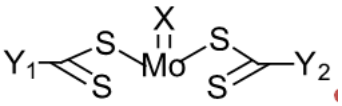
Formula I



Formula II



Formula III



Formula IV

wherein each of R_1, R_2, R_3, and R_4, is a hydrocarbon group and wherein R_1, R_2, R_3, and R_4 can be the same or different; each X is oxygen or sulfur and each X can be the same or different; and wherein each of Y_1 and Y_2 is oxygen, nitrogen or carbon-containing ligands and Y_1 and Y_2 can be the same or different

b) using the treated, pre-passivated process equipment to process a hydrocarbon feedstock comprising a foulant such that the hydrocarbon feedstock contacts the pre-passivated surface; and

c) introducing a fouling inhibiting composition into the hydrocarbon feedstock, wherein the fouling inhibiting composition comprises at least one molybdenum-containing complex having the formula selected from the group consisting of Formula I, II, III, and IV as defined above.

2. The method as in claim 1, wherein the process equipment comprises carbon steel, stainless steel, or a nickel-chromium-iron alloy.

3. The method as in any one of the preceding claims, wherein the foulant comprises coke.

4. The method as in any one of the preceding claims, wherein the foulant comprises a corrosion product.

5. The method as in any one of the preceding claims, wherein the foulant comprises catalyst fines.

6. The method as in any one of the preceding claims, wherein the molybdenum-containing complex is introduced to the hydrocarbon feedstock in step c) in an amount in the range from 1 ppm to 3000 ppm of the hydrocarbon feedstock volume.

7. The method as in any one of the preceding claims, wherein the fouling inhibiting composition further comprises one or more asphaltene inhibitors, paraffin inhibitors, scale inhibitors, emulsifiers, water clarifiers, dispersants, emulsion breakers, or any combination thereof.

8. The method as in any one of the preceding claims, wherein the at least one molybdenum-containing complex has formula I and/or II.

9. The method as in any one of the preceding claims, wherein the at least one molybdenum-containing complex has formula III and/or IV.

10. The method as in any one of the preceding claims, wherein the at least one molybdenum-containing complex comprises a molybdenum dithiocarbamate, a molybdenum dithiophosphate, or combinations thereof.

11. The method of claim 1, wherein the at least one molybdenum-containing complex comprises a molybdenum alkyldithiocarbamate.

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

13. The method of claim 1, wherein the at least one molybdenum-containing complex comprises a molybdenum alkyldithiophosphate.

14. The method as in any one of the preceding claims, wherein the introducing the molybdenum-containing complex to the hydrocarbon feedstock in step c) inhibits foulant deposition onto the process equipment compared to operating the process equipment under the same conditions without the introduction of the molybdenum-containing complex.

15. A method of inhibiting fouling in a process containment, comprising:

a) prior to introducing a hydrocarbon fluid source comprising one or more foulants into the process containment, pre-passivating a metal surface of the process containment to provide a treated, pre-passivated process containment surface, said pre-passivating comprising contacting the metal surface with a fouling inhibiting, passivating composition comprising at least one molybdenum-containing complex;

b) contacting the pre-passivated process containment surface with the hydrocarbon fluid source comprising the one or more foulants; and

c) providing a fouling inhibiting composition in the hydrocarbon fluid source, wherein the corrosion inhibiting composition comprises at least one molybdenum-containing complex.