CLAIMS:

1. An anti-fouling composition for inhibiting fouling of a structural part in a petroleum-refining system exposed to a hydrocarbon fluid, the anti-fouling composition comprising:

from 10 wt.% to 90 wt.% of a resin comprising an alkyl phenol-aldehyde resin; and

from 10 wt.% to 90 wt.% of a polyolefin comprising a polyalkylene ester, polyolefin amide alkeneamine, or a combination thereof,

wherein the anti-fouling composition inhibits fouling of a structural part in a petroleum-refining system exposed to a hydrocarbon fluid.

2. The anti-fouling composition of claim 1, the composition further comprising an effective amount of a polyalkylene imide, an amine-substituted polyalkylene imide, or a combination thereof.

3. The anti-fouling composition of claim 1 or 2, the composition further comprising an effective amount of a chelating compound comprising N,N'-disalicylidene-1,2-propanediamine.

4. The anti-fouling composition of any one of claims 1 to 3, wherein the alkyl phenol-aldehyde resin comprises an alkyl phenol-formaldehyde resin.

5. The anti-fouling composition of claim 4, wherein the alkyl phenol-aldehyde resin comprises a C_1-C_{20} alkyl phenol-aldehyde resin.

6. The anti-fouling composition of claim 5, wherein the alkyl phenol-aldehyde resin comprises a nonyl phenol-formaldehyde resin.

7. The anti-fouling composition of any one of claims 1 to 6, comprising the polyalkylene ester, wherein the polyalkylene ester comprises a polyalkylene succinic

ester, a polyalkylene succinic anhydride, polyalkylene succinic acid, or a combination thereof.

8. The anti-fouling composition of claim 7, wherein the polyalkylene ester comprises a polyethylene succinic ester, a polyethylene succinic anhydride, a polyethylene succinic acid, a polypropylene succinic ester, a polypropylene succinic anhydride, a polypropylene succinic acid, a polyisobutylene succinic ester, a polyisobutylene succinic anhydride, a polyisobutylene succinic acid, or a combination thereof.

9. The anti-fouling composition of claim 7, wherein the polyalkylene ester comprises a polyisobutylene succinic ester.

10. The anti-fouling composition of claim 9, wherein the polyisobutylene succinic ester is derived from a reaction of polyisobutylene succinic anhydride and a polyol.

11. The anti-fouling composition of claim 10, wherein the polyol comprises pentaerythritol, triethanolamine, glycerol, glucose, sucrose, arabitol, erythritol, maltitol, mannitol, ribitol, sorbitol, xylitol, threitol, galactitol, isomalt, iditol, lactitol, or a combination thereof.

12. The anti-fouling composition of claim 11, wherein the polyol comprises pentaerythritol.

13. The anti-fouling composition of any one of claims 2 to 12, comprising the polyalkylene imide or the amine-substituted polyalkylene imide, wherein the polyalkylene imide is a polyalkylene succinimide and the amine-substituted polyalkylene imide is an amine-substituted polyalkylene succinimide.

14. The anti-fouling composition of claim 13, wherein the polyalkylene succinimide is a polyethylene succinimide, a polyisopropylene succinimide, a polyisobutylene succinimide, or a combination thereof; and the amine-substituted polyalkylene

succinimide is an amine-substituted polyethylene succinimide, an amine-substituted polyisopropylene succinimide, an amine-substituted polyisobutylene succinimide, or a combination thereof.

15. The anti-fouling composition of any one of claims 1 to 14, wherein the resin is present at a concentration from 20 to 80 wt.%, and the polyolefin is present at a concentration from 20 to 80 wt.%, based on the total weight of the resin and the polyolefin.

16. A method for reducing or preventing fouling of a structural part in a petroleum-refining system exposed to a hydrocarbon fluid, comprising contacting the structural part with an effective amount of the anti-fouling composition of any one of claims 1 to 15.

17. The method of claim 16, wherein the hydrocarbon fluid is a petrochemical fluid, and the petrochemical fluid comprises an asphaltene, a paraffin, a wax, a scale, a naphthenate, coke, or a combination thereof.

18. The method of claim 17, wherein the anti-fouling composition is contacted with the petrochemical fluid in an effective amount to disperse asphaltene or to prevent or reduce deposition of coke.

19. The method of any one of claims 16 to 18, wherein the structural part comprises part of a production, a storage unit, a heat exchanger, a pipe, a pump, a flow meter, a valve, a desalter, a furnace, a coker, a distillation column, a fractionation column, an atmospheric column, a pipe still, a debutanizer, a reactor, a fluid catalytic cracking unit, a fluid catalytic cracking slurry settler, a hydrocracking unit, a steam cracking unit, a thermal cracking unit, a visbreaker, a reflex unit, a condenser, a scrubber, or a combination thereof; preferably, the structural part comprises part of a heat exchanger, a crude processing unit, a fluid catalytic cracking unit, a visbreaker, or a combination thereof.

20. The method of any one of claims 16 to 19, wherein the effective amount of the anti-fouling composition is from 1 ppm to 500 ppm.