The claims defining the invention are as follows:

1. A surfactant formulation when used for treating a fossil fluid-bearing subterranean formation comprising a nonionic surfactant, organic acid selected from citric acid, diglycolic acid, glycolic acid and a salt thereof, and injection water, wherein the nonionic surfactant is an alkoxylated alkylpenol comprising one or more propoxylate groups and one or more ethoxylate groups, wherein the alkylphenol is phenol having one or more linear or branched C_1 to C_{25} alkyl groups attached thereto.

2. The surfactant formulation according to claim 1, wherein the organic acid is glycolic acid or a glycolic acid salt.

3. The surfactant formulation according to claim 2, wherein the glycolic acid salt is at least one of sodium glycolate and disodium glycolate.

4. The surfactant formulation according to any one of claims 1 to 3, wherein the injection water is seawater, brine, fresh water from an aquifer, river or lake, or a mixture thereof.

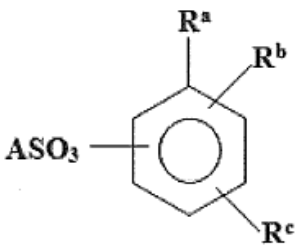
5. The surfactant formulation according to any one of claims 1 to 4, wherein the surfactant formulation further comprises an alkali metal hydroxide, alkali metal carbonate, or alkali metal chloride.

6. The surfactant formulation according to any one of claims 1 to 5, wherein the alkoxylated alkylphenol comprises 1 to 50 propoxylate groups and 1 to 50 ethoxylate groups.

7. The surfactant formulation according to any one of claims 1 to 6, wherein the alkylphenol is phenol having two or more linear or branched C_1 to C_{25} alkyl groups attached thereto.

8. The surfactant formulation according to any one of claims 1 to 7, wherein the surfactant formulation further comprises a co-surfactant selected from the group consisting of:

(a) an alkylaryl sulfonate represented by formula (II):



(II)

wherein R^a is a hydrogen or an alkyl group containing from 1 to 3 carbon atoms, R^b is hydrogen or an alkyl group containing from 1 to 3 carbon atoms, R^c is an alkyl group containing from 8 to 40 carbon atoms, and A is a monovalent cation;

(b) an alkyl diphenyl oxide sulfonic acid or its salt;

(c) an internal olefin sulfonate; and

(d) combinations thereof.

9. The surfactant formulation according to any one of claims 1 to 8, wherein the organic acid and the nonionic surfactant are present at a ratio ranging between about 0.05 parts by weight organic acid or a salt thereof to about 15 parts by weight nonionic surfactant and about 2 parts by weight organic acid or a salt thereof to about 10 parts by weight nonionic surfactant.

10. The surfactant formulation according to claim 9, wherein the ratio is between about 0.5 parts by weight organic acid or a salt thereof to about 12 parts by weight nonionic surfactant and about 1.25 parts by weight organic acid or a salt thereof to about 9 parts by weight nonionic surfactant.

11. The surfactant formulation according to claim 9 or claim 10, wherein the ratio is about 0.5 parts by weight organic acid or a salt thereof to about 12 parts by weight nonionic surfactant.

12. The surfactant formulation according to claim 9 or claim 10, wherein the ratio is about 1.25 parts by weight organic acid or a salt thereof to about 9 parts by weight nonionic surfactant.