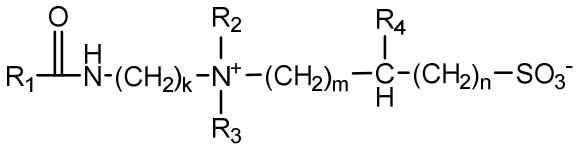
CLAIMS

1. A viscoelastic fluid for a subterranean formation comprising:

viscoelastic surfactant according to formula (I):



where R_1 is a saturated or unsaturated hydrocarbon group of from 17 to 29 carbon atoms, R_2 and R_3 are each independently selected from a straight chain or branched alkyl or hydroxyalkyl group of from 1 to 6 carbon atoms, R_4 is selected from H, hydroxyl, alkyl or hydroxyalkyl groups of from 1 to 4 carbon atoms; k is an integer of from 2-20; m is an integer of from 1-20; and n is an integer of from 0-20;

brine solution;

at least one polyacrylamide viscosity modifier with a weight averaged molecular weight (Mw) from 250,000 g/mol to 40,000,000 g/mol; and

at least 30% by weight of one or more metal salts.

2. The viscoelastic fluid for a subterranean formation according to claim 1, further comprising solvent.

3. The viscoelastic fluid for a subterranean formation according to claim 2, where the solvent is selected from water, alcohol, or combinations thereof.

4. The viscoelastic fluid for a subterranean formation according to claim 3, where the alcohol comprises monohydric alkyloxy, diol, triol, or a combination thereof.

5. The viscoelastic fluid for a subterranean formation according to claim 1, in which the viscoelastic fluid comprises 0.5% to 20% by volume, or 2% to 8% by volume, or 3% to 6% by volume of viscoelastic surfactant.

6. The viscoelastic fluid for a subterranean formation according to claim 1, in which the viscoelastic fluid comprises about 80% to 99% by weight of brine solution.

7. The viscoelastic fluid for a subterranean formation according to claim 1, in which the metal salts are metal halides that comprise calcium chloride, calcium bromide, zinc bromide, or combinations thereof.

8. The viscoelastic fluid for a subterranean formation according to claim 1, in which the metal salts comprise one or more alkali or alkaline earth metal halides.

9. The viscoelastic fluid for a subterranean formation according to claim 1, in which the polyacrylamide comprises nonionic polyacrylamides, acrylamide copolymers, polyacrylamide-based terpolymers, polyacrylamide-based tetra-polymers, modified polyacrylamides, or combinations thereof.

10. The viscoelastic fluid for a subterranean formation according to claim 1, in which the polyacrylamide viscosity modifier has an Mw from 2,000,000 g/mol to 8,000,000 g/mol.

11. The viscoelastic fluid for a subterranean formation according to claim 1 further comprising at least one additional additive.

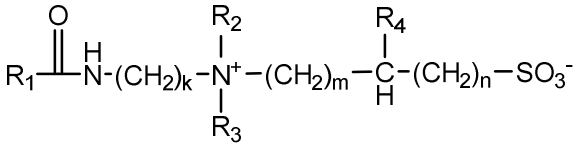
12. The viscoelastic fluid for a subterranean formation according to claim 11, in which the additional additive comprises one or more polyelectrolytes selected from a list consisting of: polycations, polyanions, zwitterionic polymers, zwitterionic polyacrylamides, and zwitterionic copolymers.

13. The viscoelastic fluid for a subterranean formation according to claim 1 further comprising breaker material.

14. The viscoelastic fluid for a subterranean formation according to claim 1, further comprising an additional surfactant, where the additional surfactant comprises cationic surfactant, anionic surfactant, non-ion surfactant, zwitterionic surfactant or a combination thereof.

15. A viscoelastic fluid for a subterranean formation comprising:

viscoelastic surfactant according to formula (I):



where R_1 is a saturated or unsaturated hydrocarbon group of from 17 to 29 carbon atoms, R_2 and R_3 are each independently selected from a straight chain or branched alkyl or hydroxyalkyl group of from 1 to 6 carbon atoms, R_4 is selected from H, hydroxyl, alkyl or hydroxyalkyl groups of from 1 to 4 carbon atoms; k is an integer of from 2-20; m is an integer of from 1-20; and n is an integer of from 0-20;

brine solution;

at least one polyacrylamide viscosity modifier with a weight averaged molecular weight (Mw) from 250,000 g/mol to 40,000,000 g/mol; and

at least 30% by weight of one or more metal salts;

wherein the polyacrylamide viscosity modifier has a hydrolysis level of less than 1 mol%.

16. The viscoelastic fluid for a subterranean formation according to claim 15, where the polyacrylamide viscosity modifier comprises a nonionic polyacrylamide.

17. The viscoelastic fluid for a subterranean formation according to claim 15, further comprising solvent.

18. The viscoelastic fluid for a subterranean formation according to claim 17, where the solvent is selected from water, alcohol, or combinations thereof.

19. The viscoelastic fluid for a subterranean formation according to claim 15, in which the viscoelastic fluid comprises 0.5% to 20% by volume, or 2% to 8% by volume, or 3% to 6% by volume of viscoelastic surfactant.

20. The viscoelastic fluid for a subterranean formation according to claim 15, in which the metal salts are metal halides that comprise calcium chloride, calcium bromide, zinc bromide, or combinations thereof.

21. The viscoelastic fluid for a subterranean formation according to claim 15, in which the brine solution comprises one or more alkali or alkaline earth metal halides.

22. The viscoelastic fluid for a subterranean formation according to claim 15, in which the polyacrylamide comprises nonionic polyacrylamides, acrylamide copolymers, polyacrylamide-based terpolymers, polyacrylamide-based tetra-polymers, modified polyacrylamides, or combinations thereof.

23. The viscoelastic fluid for a subterranean formation according to claim 15, in which the polyacrylamide viscosity modifier has an Mw from 2,000,000 g/mol to 8,000,000 g/mol.

24. The viscoelastic fluid for a subterranean formation according to claim 15, further comprising an additional surfactant, where the additional surfactant comprises cationic surfactant, anionic surfactant, non-ion surfactant, zwitterionic surfactant or a combination thereof.