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A Review of Recent Advances in Foam-Based Fracturing Fluid Application in Unconventional Reservoirs

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Highlights

- High quality stable foams are effective proppant carrier fluids
- Foam fracturing fluids can increase fractured wells productivity
- Foam instability at downhole conditions limits field applications
- Ultra-dry nanoparticles-stabilized and viscoelastic surfactant foam are trending
- Nanoparticles can serve dual purpose of foam stabilizers and nanoproppants

Abstract

Foam-based fracturing fluid application in unconventional reservoirs has recently attracted prodigious attention, due to their high apparent viscosity and ultra-low water contents, which enhanced their potential applications as proppants carrier fluids in water sensitive formations. A comprehensive review of existing literature on the applications and recent advancement of foam fracturing fluid is conducted in this study. Results of experimental studies, simulations predictions and field applications were extensively discussed. Challenges and knowledge gaps were identified and directions for future studies were suggested. The review literature suggested that stable foam fracturing fluids can increase the productivity of the fractured wells.