CLAIMS

1. An oil-based drilling fluid comprising:
a base oil continuous phase;
an aqueous discontinuous phase; and
at least one rheology modifier, the at least one rheology modifier comprising a magnesium adamantane carboxylate compound.

2. The oil-based drilling fluid of claim 1, where the oil-based drilling fluid comprises from 0.1 wt.% to 1.0 wt.% rheology modifier, based on the total weight of the oil-based drilling fluid.

3. The oil-based drilling fluid of claim 1, where the oil-based drilling fluid exhibits physical characteristics suitable for use of the oil-based drilling fluid under high-pressure high-temperature conditions during drilling operations, where high-pressure high-temperature conditions during drilling operations comprise a wellbore pressure greater than 10,000 psi and a wellbore temperature greater than 300 °F.

4. The oil-based drilling fluid of claim 1, where the oil-based drilling fluid with the rheology modifier has lower viscosity both before hot rolling and after hot rolling at 100 rpm, compared to a drilling fluid having an identical specific gravity and oil-to-water ratio and identical ingredients in identical proportions to the oil-based drilling fluid but lacking the rheology modifier.

5. The oil-based drilling fluid of claim 1, where the oil-based drilling fluid with the rheology modifier has a lower after-hot rolling fluid loss at 350 °F (177 °C) and 500 psi, compared to a drilling fluid having an identical specific gravity and oil-to-water ratio and identical ingredients in identical proportions to the oil-based drilling fluid but lacking the rheology modifier.

6. The oil-based drilling fluid of claim 1, where the oil-based drilling fluid with the rheology modifier has higher electrical stability, compared to a drilling fluid having an identical specific gravity and oil-to-water ratio and identical ingredients in identical proportions to the oil-based drilling fluid but lacking the rheology modifier.

7. A method for preparing an oil-based drilling fluid, the method comprising:

mixing a base oil, at least one emulsifier, and at least one wetting agent to form a first mixture;

adding and mixing at least one rheology modifier into the first mixture to form a second mixture, wherein the at least one rheology modifier comprises a magnesium adamantane carboxylate compound;

adding and mixing at least one fluid-loss control additive into the second mixture to form a third mixture;

adding and mixing a brine solution into the third mixture to form a fourth mixture; and

adding and mixing a weighting additive into the fourth mixture to form the oil-based drilling fluid.

8. The method of claim 7, where the magnesium adamantane carboxylate compound is prepared by:

mixing a magnesium salt and a diamondoid compound having at least one carboxylic acid moiety to form a reactant mixture; and

hydrothermally treating the reactant mixture at a reaction temperature for a reaction time to form the magnesium adamantane carboxylate salt.

9. The method of claim 8, where the magnesium salt and the diamondoid compound are mixed in amounts that provide a ratio of Mg^{2+} to diamondoid compound in the reaction mixture of from 0.5:1 to 1.0:1.

10. The method of claim 8, where the magnesium salt is $Mg(OH)_2$.

11. The method of claim 8, where the reaction temperature is from 100 °C to 180 °C.

12. The method of claim 8, where the magnesium adamantane carboxylate salt comprises a layered morphology.

13. The method of claim 7, where the oil-based drilling fluid comprises from 0.1 wt.% to 1.0 wt.% rheology modifier, based on the total weight of the oil-based drilling fluid.

14. A method for drilling in a subterranean formation under high-pressure high-temperature conditions, the method comprising:

providing or using in the drilling of a wellbore into the subterranean formation an oil-based drilling fluid, the oil-based drilling fluid comprising:

a base oil continuous phase;

an aqueous discontinuous phase; and

at least one rheology modifier, the at least one rheology modifier comprising a magnesium adamantane carboxylate compound.

15. The method of claim 14, where the high-pressure high-temperature conditions comprise a wellbore pressure greater than 10,000 psi and a wellbore temperature greater than 300 °F.