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 alkaline-earth diamondoid compound is a magnesium adamantane carboxylate compound 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.

3. The oil-based drilling fluid of claim 2, 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.

4. The oil-based drilling fluid of claim 2, where the diamondoid compound is 1-adamantane carboxylic acid.

5. The oil-based drilling fluid of claim 2, where the magnesium adamantane carboxylate salt comprises a layered morphology.

6. 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.

7. 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.

8. 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.

9. 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.

10. 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.

11. 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.

12. The method of claim 11, 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.

13. The method of claim 12, 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.

14. The method of claim 12, where the magnesium salt is $Mg(OH)_2$.

15. The method of claim 12, where the reaction temperature is from 100°C to 180°C.

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

17. The method of claim 11, 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.

18. 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.

19. The method of claim 18, where the high-pressure high-temperature conditions comprise a wellbore pressure greater than 10,000 psi and a wellbore temperature greater than 300°F.