CLAIMS

1. A method of cementing a subterranean formation comprising:

providing a cement composition comprising:

an aqueous base fluid; and

solid materials comprising:

a cementitious material;

nanoparticles comprising nano-silica;

a synthetic clay; and

a thixotropic modifier, wherein the thixotropic modifier is selected from sodium silicate, silicic acid, and combinations thereof;

introducing the cement composition into a subterranean formation; and

allowing the cement composition to set into the subterranean formation.

2. The method of claim 1, wherein the solid materials are 10 wt% to 20 wt% of the total weight of the cement composition.

3. The method of claim 1, wherein the nanoparticles comprise at least one of nano-silica, nanocarbonate, nanoalumina, and any combination thereof.

4. The method of claim 1, wherein the nanoparticles are present in the amount of 0.1 to 5 gal/sack.

5. The method of claim 1, wherein the nanoparticles have a diameter of 2 to 100 microns.

6. The method of claim 1, wherein the synthetic clay is present in an amount of 0.1% to 3.0% by weight of water.

7. The method of claim 1, wherein substantially no natural clay is added to the cement composition.

8. The method of claim 1, wherein the aqueous base fluid comprises at least one of fresh water; brackish water; saltwater; and combinations thereof.

9. The method of claim 1, wherein the aqueous base fluid is present in the cement composition in an amount of from 20% to 80% by weight of the cement composition.

10. The method of claim 1, wherein the cementitious material comprises at least one of Portland cements; gypsum cements; high alumina content cements; slag cements; high magnesia content cements; shale cements; acid/base cements; fly ash cements; zeolite cement systems; kiln dust cement systems; microfine cements; metakaolin; pumice; and combinations thereof.

11. The method of claim 1, further comprising at least one of resins; latex; stabilizers; silica; pozzolans; microspheres; aqueous superabsorbers; viscosifying agents; suspending agents; dispersing agents; salts; accelerants; surfactants; retardants; defoamers; settling-prevention agents; weighting materials; fluid loss control agents; elastomers; vitrified shale; gas migration control additives; formation conditioning agents; and combinations thereof.

12. The method of claim 1, wherein the density of the cement composition before curing is less than 12 pounds per gallon.

13. The method of claim 1, wherein the thixotropic modifier is present in the amount of 0.1% to 150% bwc.

14. A well cement composition comprising:

an aqueous base fluid;

solid materials comprising:

a cementitious material;

nanoparticles comprising nano-silica;

a synthetic clay; and

a thixotropic modifier, wherein the thixotropic modifier is selected from sodium silicate, silicic acid, and combinations thereof.

15. The cement composition of claim 14, wherein the solid materials are 10 wt% to 20 wt% of the total weight of the cement composition.

16. The cement composition of claim 14, wherein the nanoparticles comprise at least one of nano-silica, nanocarbonate, nanoalumina, and any combination thereof.

17. The cement composition of claim 14, wherein the nanoparticles are present in the amount of 0.1 to 5 gal/sack.

18. The cement composition of claim 14, wherein the nanoparticles have a diameter of 2 to 100 nm.

19. The cement composition of claim 14, wherein the synthetic clay is present in an amount of 0.1% to 3.0% by weight of water.

20. The cement composition of claim 14, wherein substantially no natural clay is added to the cement composition.

21. The cement composition of claim 14, wherein the aqueous base fluid comprises at least one of fresh water; brackish water; saltwater; and combinations thereof.

22. The cement composition of claim 14, wherein the aqueous base fluid is present in the cement composition in an amount of from 20% to 80% by weight of cement.

23. The cement composition of claim 14, wherein the cementitious material comprises at least one of Portland cements; gypsum cements; high alumina content cements; slag cements; high magnesia content cements; shale cements; acid/base cements; fly ash cements; zeolite cement systems; kiln dust cement systems; microfine cements; metakaolin; pumice; and combinations thereof.

24. The cement composition of claim 14, further comprising at least one of resins; latex; stabilizers; silica; pozzolans; microspheres; aqueous superabsorbers; viscosifying agents; suspending agents; dispersing agents; salts; accelerants; surfactants; retardants; defoamers; settling-prevention agents; weighting materials; fluid loss control agents; elastomers; vitrified shale; gas migration control additives; formation conditioning agents; and combinations thereof.

25. The cement composition of claim 14, wherein the density of the cement before curing is less than 12 pounds per gallon.

26. The cement composition of claim 14, wherein the thixotropic modifier is present in the amount of 0.1% to 150% bwc.

27. A wellbore cementing system comprising:

a mixing apparatus;

an aqueous base fluid; and

solid materials comprising:

a cementitious material;

nanoparticles comprising nano-silica;

a synthetic clay; and

a thixotropic modifier, wherein the thixotropic modifier is selected from sodium silicate, silicic acid, and combinations thereof;

a conduit connected to a wellbore; and

a pump connected to the mixing apparatus and the conduit.