CLAIMS

1. A stabilized emulsified acid composition for deep carbonate formation stimulation, the stabilized emulsified acid composition comprising:

a petroleum, the petroleum operable to provide a barrier between an acid and a reservoir rock;

the acid, the acid operable to react with the reservoir rock to dissolve the reservoir rock and produce a wormhole;

a functional framework, the functional framework operable to stabilize the stabilized emulsified acid, wherein the functional framework comprises a surface-modified clay material selected from an organoclay, wherein the organoclay comprises a functionalized montmorillonite-based organoclay containing 25 to 30 wt % methyl dihydroxyethyl hydrogenated tallow ammonium;

an emulsifier, the emulsifier operable to stabilize the stabilized emulsified acid; and

a corrosion inhibitor, the corrosion inhibitor operable to provide protection against corrosion for the metal components of a well,

wherein the stabilized emulsified acid composition exhibits long-term thermal stability such that the stabilized emulsified acid composition is in the absence of distinct layers at 300°F for at least 4 hours,

wherein the deep carbonate formation stimulation is at a depth in a carbonate formation of between three inches and six feet from the well.

2. The stabilized emulsified acid composition of claim 1, wherein the petroleum is diesel.

3. The stabilized emulsified acid composition of claims 1 or 2, wherein the acid is hydrochloric acid.

4. The stabilized emulsified acid composition of any of claims 1-3, wherein the functional framework further comprises at least one of zeolites and hybrid organic-inorganic materials in combination with the surface-modified clay material selected from an organoclay.

5. The stabilized emulsified acid composition of any of claims 1-4, wherein the corrosion inhibitor is a cationic ammonium-based blend.

6. A stabilized emulsified acid composition, the stabilized emulsified acid composition comprising:

diesel, hydrochloric acid, a functionalized montmorillonite-based organoclay containing 25 to 30 wt % methyl dihydroxyethyl hydrogenated tallow ammonium, and a cationic ammonium-based blend.

7. A method of creating a wormhole extending into a deep carbonate formation, the method comprising the steps of:

introducing a stabilized emulsified acid with long-term thermal stability into a well that transverses a carbonate reservoir, the stabilized emulsified acid comprising:

a petroleum, the petroleum operable to provide a barrier between an acid and a reservoir rock;

the acid, the acid operable to react with the reservoir rock to dissolve the reservoir rock and produce the wormhole;

a functional framework, the functional framework operable to stabilize the stabilized emulsified acid, wherein the functional framework comprises a surface-modified clay material selected from an organoclay, wherein the organoclay comprises a functionalized montmorillonite-based organoclay containing 25 to 30 wt % methyl dihydroxyethyl hydrogenated tallow ammonium;

an emulsifier, the emulsifier operable to stabilize the stabilized emulsified acid; and

a corrosion inhibitor, the corrosion inhibitor operable to provide protection against corrosion for the metal components of a well,

wherein the stabilized emulsified acid composition exhibits long-term thermal stability such that the stabilized emulsified acid composition is in the absence of distinct layers at 300°F for at least 4 hours,

wherein the deep carbonate formation stimulation is at a depth in a carbonate formation of between three inches and six feet from the well;

allowing the stabilized emulsified acid to react with the carbonate reservoir, wherein the reaction between the stabilized emulsified acid dissolves the carbonate reservoir and produces the wormhole, wherein the stabilized emulsified acid is stable for a reaction time, such that in the reaction time the wormhole reaches the deep carbonate formation.

8. The method of claim 7, wherein the petroleum is diesel.

9. The method of claims 7 or 8, wherein the acid is hydrochloric acid.

10. The method of any of claims 7-9, wherein the functional framework further comprises at least one of zeolites and hybrid organic-inorganic materials in combination with the surface-modified clay material selected from an organoclay.

11. The method of any of claims 7-10, wherein the corrosion inhibitor is a cationic ammonium-based blend.