Claims

What is claimed is:

1. A method, comprising:

providing an expandable metal slurry downhole in a wellbore, the expandable metal slurry comprising granules of an expandable metal material suspended or dispersed in a fluid, wherein the granules of the expandable metal material comprise a specific surface area between 0.05 m^2/kg and 400 m^2/kg, wherein the expandable metal material comprises a metal, or metal alloy comprising the metal, selected from the group consisting of magnesium, aluminum, zinc, and any combination thereof ; and

positioning the expandable metal slurry within the wellbore such that the granules of the expandable metal material in the expandable metal slurry are ~~activatable~~ activated to expand and form a seal within the wellbore.

2. The method of claim 1, wherein providing the expandable metal slurry downhole in the wellbore comprises pumping the expandable metal slurry in an annulus between a wall of the wellbore and casing or within an inner-diameter of the casing.

3. The method of claim 1, wherein the seal comprises a shoe seal, a liner seal, a plug, a kickoff plug, a casing collar, a gravel-pack zonal isolation seal, or a casing anchor.

~~4. The method of claim 1, wherein the granules of the expandable metal material in the expandable metal slurry comprise a metal, or metal alloy comprising the metal, selected from the group consisting of magnesium, aluminum, zinc, and any combination thereof.~~

~~5.~~ 4. The method of claim 1, wherein the granules of the expandable metal material swell to form a seal between (i) a wall of the wellbore and (ii) a portion of casing or a portion of a gravel-pack screen.

~~6.~~ 5. The method of claim 1, wherein the granules of the expandable metal material have a surface area between 0.05 and 100 m^2/kg.

~~7.~~ 6. The method of claim 1, further comprising:

positioning a first layer of proppant within the wellbore surrounding a gravel-pack screen downhole from the expandable metal slurry; and

positioning a second layer of proppant within the wellbore uphole from the first layer of proppant and the expandable metal slurry, wherein the seal within the wellbore generates zonal isolation between the first layer of proppant and the second layer of proppant.

~~8.~~ 7. An expandable metal slurry comprising:

a fluid for performing a wellbore operation; and

granules of a metal material suspended or dispersed in the fluid, the granules of the metal material being controllably activatable in a wellbore to expand to form a seal within the wellbore, wherein the granules of the metal material comprise a specific surface area between 0.05 m^2/kg and 400 m^2/kg, wherein the metal material comprises a metal, or metal alloy comprising the metal, selected from the group consisting of magnesium, aluminum, zinc, and any combination thereof.

~~9.~~ 8. The expandable metal slurry of claim ~~8~~ 7, wherein each of the granules of the metal material comprise a coating layer that slows an activation process of the metal material.

~~10.~~ 9. The expandable metal slurry of claim ~~9~~ 8, wherein an expandable metal portion of the granules of the metal material comprise a surface area that is greater than 100 m^2/kg.

~~11.~~ 10. The expandable metal slurry of claim ~~8~~ 7, wherein the fluid for performing the wellbore operation is an oil-based fluid, and wherein the granules of the metal material are controllably activatable by subjecting the granules of the metal material to a water-based fluid.

~~12.~~11. The expandable metal slurry of claim ~~8~~ 7, wherein the seal comprises a shoe seal, a liner seal, a plug, a kickoff plug, a casing collar, a gravel-pack zonal isolation seal, or a casing anchor.

~~13. The expandable metal slurry of claim 8, wherein the metal material comprises a metal, or metal alloy comprising the metal, selected from the group consisting of magnesium, aluminum, zinc, and any combination thereof.~~

~~14.~~12. The expandable metal slurry of claim ~~8~~ 7, wherein the seal formed by the metal material comprises a metal hydroxide.

~~15.~~ 13. The expandable metal slurry of claim ~~8~~ 7, further comprising:

additive granules or fibers for increasing a packing density of the seal, wherein the additive granules or fibers comprise proppant, elastomers, plastics, ceramics, metals, or a combination thereof.

~~16.~~ 14. A material comprising:

an expandable metal granule comprising a specific surface area between 0.05 m^2/kg and 400 m^2/kg; and

a layer coating the expandable metal granule, the layer positionable to slow a hydration reaction of the expandable metal granule to form a seal in a wellbore,

wherein the expandable metal granule comprises a metal, or a metal alloy comprising the metal, selected from the group consisting of magnesium, aluminum, zinc, and any combination thereof.

~~17.~~ 15. The material of claim ~~16~~ 14, wherein the layer comprises a metal coating, a ceramic coating, a polymer coating, or an organic coating.

~~18.~~ 16. The material of claim ~~16~~ 14, wherein the expandable metal granule comprises a surface area between 0.05 and 400 m^2/kg.

~~19.~~ 17. The material of claim ~~16~~ 14, wherein the expandable metal granule and the layer are suspendable or dispersable in a water-based fluid during injection into a wellbore.

~~20. The material of claim 16, wherein the expandable metal granule comprises a metal, or a metal alloy comprising the metal, selected from the group consisting of magnesium, aluminum, zinc, and any combination thereof.~~