CLAIMS

What is claimed is:

1. An expandable packer locatable in a borehole having a borehole wall, the expandable packer comprising:

an activatable sealing element comprising:

at least one of a swellable metal or a swellable metal alloy having a first volume and capable of hydrolyzing when reacted with a reactive fluid to form a reaction product comprising a swelled metal hydroxide or swelled metal oxide that is insoluble in water and having a second volume greater than the first volume;

an openable container housing the reactive fluid;

a mechanical element comprising at least one of a piston, a gate, a port, a valve, or a rupture disk separating the reactive fluid from the activatable sealing element and operable to open the openable container and cause the reactive fluid to contact the activatable sealing element such that the activatable sealing element reacts with the reactive fluid to form the reaction product, the second volume of which is sufficient to place the reaction product into sealing engagement with the borehole wall;

a cover sleeve separating the swellable metal from an annular space surrounding the cover sleeve, wherein the cover sleeve is selectively removable to expose the swellable metal to the annular space; and

wiper plugs positioned between the cover sleeve and the borehole wall and between the openable container and the borehole wall to at least partially seal the annular space,

wherein the contact between the reactive fluid and activatable sealing element produces hydrogen gas, and

wherein the wiper plugs are configured to allow at least some of the hydrogen gas to vent through the wiper plugs.

2. The expandable packer of claim 1, wherein the swellable metal is contained within a hydrostatic chamber.

3. The expandable packer of claim 2, further comprising the openable container being openable by operation of a downhole power unit.

4. The expandable packer of claim 1, wherein the swellable metal is in the form of beads, wires, pellets, powder, particles, granules, or a combination thereof.

5. A method of forming a seal in a borehole comprising a wall, the method comprising:
locating an expandable packer comprising an activatable sealing element comprising at least one of a swellable metal or a swellable metal alloy having a first volume, a reactive fluid contained in an openable container, and a mechanical element within the borehole;
operating the mechanical element comprising at least one of a piston, a gate, a port, a valve, or a rupture disk to open the openable container and cause the reactive fluid to contact and react with the activatable sealing element to hydrolyze the swellable metal to form a reaction product comprising a swelled metal hydroxide or swelled metal oxide that is insoluble in water;
expanding the reaction product into sealing engagement with the wall to form a seal;
producing hydrogen gas from the contact between the reactive fluid and activatable sealing element; and
venting at least some of the hydrogen gas through wiper plugs positioned between the activatable sealing elements and the wall.

6. The method of claim 5, wherein the reactive fluid does not contact the swellable metal without operation of the mechanical element.

7. The method of claim 5, wherein the swellable metal includes an alkaline earth metal, a transition metal, a post-transition metal, or a combination thereof.

8. The method of claim 5, wherein the swellable metal includes, or the swellable metal alloy includes an alloy including, magnesium, calcium, aluminum, or combinations thereof.

9. The expandable packer of claim 1, wherein the swellable metal includes an alkaline earth metal, a transition metal, a post-transition metal, or a combination thereof.

10. The expandable packer of claim 1, wherein the swellable metal includes, or the swellable metal alloy includes an alloy including, magnesium, calcium, aluminum, or combinations thereof.