

Claims

What is claimed is:

1. An apparatus comprising:
a tool operable to allow diversion of flow from an inner diameter of a casing through one or more ports at an outer diameter of the casing during operation in a borehole; and
an alterable material structured as a portion of the tool such that the alterable material blocks access to the one or more ports, isolating the inner diameter from the annulus while running the casing into the borehole, until altering conditions of the alterable material occur that allows flow to be initiated from the inner diameter to the annulus, the alterable material being a dissolvable material or a degradable material.
2. The apparatus of claim 1, wherein the alterable material is structured as a sleeve on the inner diameter of the casing such that the sleeve breaks up according to the altering conditions.
3. The apparatus of claim 1, wherein the alterable material is a dissolvable material composed from materials that dissolve over time based on temperature.
4. The apparatus of claim 3, where the dissolvable material includes material that has an average dissolution rate in excess of $0.01 \text{ mg/cm}^2/\text{hr}$ at 200°F in 15% KCl at a pH of 7.
5. The apparatus of claim 3, wherein the dissolvable material includes one or more of a magnesium alloy or an aluminum alloy.
6. The apparatus of claim 5, wherein the magnesium alloy is a magnesium alloy alloyed with a dopant, the dopant selected from a group including iron, nickel, copper, carbon, and tin.
7. The apparatus of claim 5, wherein the aluminum alloy is an aluminum alloy that is alloyed with a dopant, the dopant selected from a group including gallium, mercury, indium, iron, copper, nickel, and tin.

8. The apparatus of claim 3, wherein the dissolvable material includes a dissolvable metal matrix having added particles, the added particles being non-dissolving metal or non-dissolving ceramic.
9. The apparatus of claim 8, wherein the non-dissolving ceramic includes a ceramic selected from a group including zirconia, alumina, carbide, boride, nitride, synthetic diamond, silica.
10. The apparatus of claim 1, wherein the alterable material is a degradable material.
11. The apparatus of claim 10, wherein the degradable material includes a degradable metal alloy exhibiting a nano-structured matrix form and/or inter-granular inclusions.
12. The apparatus of claim 11, wherein the degradable metal alloy includes a dopant such that presence of the dopant increases degradation rate of the degradable metal alloy relative a degradation rate without the dopant.
13. The apparatus of claim 10, wherein the degradable material includes a solution-structured galvanic material.
14. The apparatus of claim 13, wherein the solution-structured galvanic material is a structure of zirconium containing a magnesium alloy in which different domains within the structure contain different percentages of zirconium.
15. The apparatus of claim 10, wherein the degradable material includes degradable metal magnesium alloys solution structured with one or more elements selected from a group including zinc, aluminum, nickel, iron, carbon, tin, silver, copper, titanium, a rare earth element, and combinations thereof.

16. The apparatus of claim 10, wherein the degradable material includes metal aluminum alloys solution structured with one or more elements selected from a group including nickel, iron, carbon, tin, silver, copper, titanium, gallium, mercury, and combinations thereof.”

17. The apparatus of claim 1, wherein the alterable material is structured as one or more unique plugs.

18. The apparatus of claim 17, wherein the one or more unique plugs are arranged as obstructions to the one or more ports.

19. The apparatus of claim 1, wherein the one or more ports include a rupture disc.

20. A method comprising:

running a tool in a borehole as part of a completion system, the tool operable to allow diversion of flow from an inner diameter of a casing through one or more ports at an outer diameter of the casing during operation in the borehole, the tool including an alterable material structured such that the alterable material blocks access to the one or more ports, isolating the inner diameter from the annulus while running the casing into the borehole, until altering conditions of the alterable material occur that allows flow to be initiated from the inner diameter to the annulus, the alterable material being a dissolvable material or a degradable material;

securing the casing;

pressure testing the casing; and

fracturing formation around the borehole after a time at which breaking up of the alterable material, according to the altering conditions, has substantially completed.