CLAIMS

What is claimed is:

1. A seal for downhole use in a wellbore, comprising:

a heat-hardening material, wherein the heat-hardening material is a thermoset elastomer that includes one or more additives incorporated into the heat-hardening material to accelerate cross-linking when exposed to a downhole temperature in the wellbore; and

a heat-stable material;

wherein the heat-hardening material has a stiffness that increases when exposed to the downhole temperature and the heat-stable material has a stiffness that does not increase or increases to a lesser degree than that the heat-hardening material at the downhole temperature.

2. The seal of claim 1, wherein the heat-hardening material comprises one or more of hydrogenated acrylonitrile butadiene rubber, acrylonitrile butadiene rubber, chloroprene rubber, polybutadiene rubber, poly(styrene-butadiene-styrene), styrene-butadiene rubber, ethylene propylene rubber, ethylene propylene diene monomer rubber, butyl rubber, chlorinated polyethylene, and chlorosulfonated polyethylene.

3. The seal of claim 1, wherein the heat-stable material comprises one or more of hydrogenated acrylonitrile butadiene rubber, fluoroelastomers, acrylonitrile butadiene rubber, polytetrafluoroethylene, urethane, silicone, fluorosilicone, perfluoroelastomer, ethylene acrylic, ester acrylic, tetrafluoroethylene and propylene copolymer, polyether ether ketone, polyphenylene sulfide, polysulfone, polyethersulfone, polyetherimide,

and polyetherketone.

4. The seal of claim 2, wherein the heat-stable material comprises a porous metal, wherein pores of the porous metal are filled with the heat-hardening material.

5. The seal of claim 1, further comprising a reinforcing material dispersed within the heat hardening material, the reinforcing material comprising glass, carbon, or metal fibers.

6. The seal of claim 1, wherein the seal comprises one or more layers of the heat-hardening material, one or more layers of the heat-stable material, and one or more layers of a swellable material.

7. The seal of claim 1, wherein the seal comprises a mesh of the heat-hardening material blended with the heat-stable material.

8. The seal of claim 1, wherein the heat-hardening material is a sulfur-cured hydrogenated acrylonitrile butadiene rubber and the downhole temperature is 250°F or greater.

9. The seal of claim 1, wherein

in a first configuration prior to exposure to the downhole temperature, the seal is able to strain by at least 10%; and

in a second configuration after exposure to the downhole temperature, the seal is

able to strain by less than 10%.

10. The seal of claim 1, wherein the one or more additives is a soluble fatty acid salt of metal ions including Cu, Mn, Ni, Co, or Fe.

11. A method of sealing a production zone, comprising:

providing an expandable seal comprising a heat-hardening material

and a heat-stable material, wherein the heat-hardening material, wherein the heat-hardening material is a thermoset elastomer that includes one or more additives incorporated into the heat-hardening material to accelerate cross-linking when exposed to a downhole temperature ina wellbore and has a stiffness that increases when exposed to the downhole temperature and the heat-stable material has a stiffness that does not increase or increases to a lesser degree than the heat-hardening material at the downhole temperature and wherein the expandable seal comprises a cylindrical body;

deploying the expandable seal to the production zone;

deforming the expandable seal such that a diameter of the expandable seal increases;

exposing the expandable seal to the downhole temperature, thereby hardening the heat-

hardening material of the expandable seal.

12. The method of claim 11, wherein the expandable seal comprises closed ends and a check valve at one of the closed ends; and

wherein deforming the expandable seal comprises inflating the expandable seal with a fluid.

13. The method of claim 12, further comprising:

dissolving the closed ends of the expandable seal.

14. The method of claim 11 , wherein the downhole temperature is 250°F or greater and the exposing step lasts for at least 4 hours.

15. The method of claim 14, wherein deploying the expandable seal comprises positioning the expandable seal proximate a screen of an inflow control device.

16. The method of claim 11, wherein the production zone comprises a water producing open hole zone.

17. A system for deploying a seal in a wellbore, comprising:

an expandable seal; and

a deployment tool configured to carry the expandable seal to a downhole position, the downhole position having a temperature;

wherein the expandable seal comprises a first material that is a thermoset elastomer that includes one or more additives incorporated into the first material to accelerate cross-linking when exposed to the temperature in the wellbore and has a stiffness that increases when exposed to the temperature and a second material that

has a stiffness that does not increase or increases to a lesser degree than the first material at the temperature.

18. The system of claim 17,
wherein the expandable seal forms an enclosed, elongate body;
end portions of the expandable seal are formed of a degradable material; and
the expandable seal comprises a valve at one of the end portions.

19. The system of claim 17, wherein the deployment tool comprises coiled tubing and the downhole position is proximate an inflow control device.

20. The system of claim 17, wherein the expandable seal is a Y-shaped liner for a multi lateral junction.

21. The seal of claim 1, wherein the thermoset elastomer is hardened via cross-linking upon exposure to heat.

22. The system of claim 17, wherein the expandable seal is a sealing element in a packer.