CLAIMS

What is claimed is:

1. A bulk metallic catalyst precursor composition comprising:

a Group VIII metal;

a Group VIB metal, a combined amount of Group VIII metal and Group VIB metal being about 1 wt % to about 80 wt % on a metal oxide basis;

about 10 wt % to about 60 wt % of an organic compound-based component, the organic compound-based component is based on at least one organic complexing agent; and

about 1 wt % to about 50 wt % of an organo-metalloxane polymer, organo-metalloxane gel, or combination thereof,

the catalyst precursor composition having a surface area of 20 m^2/g or less based on BET.

2. The bulk metallic catalyst precursor composition of claim 1, wherein the catalyst precursor composition comprises at least about 5 wt % of the organo-metalloxane polymer, organo-metalloxane gel, or combination thereof.

3. The bulk metallic catalyst precursor composition of claim 1, wherein the organic compound-based component is further based on organic functional groups from the organo-metalloxane polymer, organo-metalloxane gel, or combination thereof.

4. The bulk metallic catalyst precursor composition of claim 1, wherein the organo-metalloxane polymer, organo-metalloxane gel, or combination thereof is water soluble.

5. The bulk metallic precursor composition of claim 1, wherein the organo-metalloxane polymer, organo-metalloxane gel, or combination thereof comprises an organo-siloxane, an organo-alumoxane, an organo-titanoxane, or a combination thereof.

6. The bulk metallic precursor composition of claim 1, wherein the organo-metalloxane polymer, organo-metalloxane gel, or combination thereof comprises an organo-siloxane polymer, and wherein at least a portion of the organic functional groups of the organo-siloxane polymer comprise amines.

7. The bulk metallic catalyst precursor composition of claim 1, wherein the organo-metalloxane polymer, organo-metalloxane gel, or combination thereof comprises an organo-alumoxane polymer, organo-alumoxane gel, or combination thereof.

8. The bulk metallic catalyst precursor composition of claim 7, wherein at least a portion of the organic functional groups of the organo-alumoxane polymer, organo-alumoxane gel, or combination thereof comprise carboxylates.

9. The bulk metallic catalyst precursor composition of claim 1, wherein the catalyst precursor composition further comprises a binder, the binder comprising a silica polymer, polyethylene glycol, or a combination thereof.

10. The bulk metallic catalyst precursor composition of claim 1, wherein the organo-metalloxane polymer, organo-metalloxane gel, or combination thereof is introduced into the bulk metallic catalyst precursor as part of a solution for forming the bulk metallic catalyst precursor.

11. The bulk metallic catalyst precursor composition of claim 1, wherein the surface area is less than 10 m^2/g, or wherein the catalyst precursor is extruded with a binder to form an extruded composition having a surface area of 30 m^2/g or less, or a combination thereof.

12. The bulk metallic catalyst precursor composition of claim 1, wherein the Group VIII metal is nickel, cobalt, or a combination thereof, and/or wherein the Group VIB metal is molybdenum, tungsten, or a combination thereof.

13. An amorphous sulfided bulk metallic catalyst comprising a sulfided form of the bulk metallic catalyst precursor composition of claim 1.

14. The amorphous sulfided bulk metallic catalyst of claim 13, wherein gas-phase sulfidation at a temperature of 350ºC or less is used on the bulk metallic catalyst precursor composition to form the sulfided bulk metallic catalyst.

15. An amorphous sulfided bulk metallic catalyst comprising:

a Group VIII metal;

a Group VIB metal;

at least about 10 wt % carbon; and

about 1 wt % to about 50 wt % of an organo-metalloxane polymer, organo-metalloxane gel, or combination thereof,

the catalyst being formed by sulfiding a catalyst precursor composition having a surface area of 20 m^2/g or less based on BET.

16. The amorphous sulfided bulk metal catalyst of claim 15, wherein the catalyst precursor composition comprises the Group VIII metal, the Group VIB metal, about 10 wt % to about 60 wt % of an organic compound-based component, and the organo-metalloxane polymer, organo-metalloxane gel, or combination thereof.

17. The amorphous sulfided bulk metallic catalyst of claim 15, which contains regions of MoS_2 having stack heights averaging about 1.1 to 2.5, wherein Mo represents a Group VIB metal, the stack heights optionally averaging about 2.2 or less, or about 2.0 or less.

18. The amorphous sulfided bulk metal catalyst of claim 15, wherein the Group VIII metal is nickel, cobalt, or a combination thereof, and/or wherein the Group VIB metal is molybdenum, tungsten, or a combination thereof.

19. The amorphous sulfided bulk metal catalyst of claim 15, wherein the surface area of the catalyst precursor composition is less than 10 m^2/g.

20. The amorphous sulfided bulk metal catalyst of claim 15, further comprising an additional transition metal, the additional transition metal optionally being Co, Ni, Zn, or a combination thereof.