Summary

In one aspect, the present disclosure relates to a method of operating a fuel cell system, comprising: providing a catalytic reactor having a sulfur oxidation catalyst including at least one Group VIII noble metal and iron; wherein the catalytic reactor is configured to contact a sulfur-containing hydrocarbon fuel and an oxidant with the sulfur oxidation catalyst; wherein the sulfur oxidation catalyst is configured to oxidize sulfur-containing compounds to form sulfur oxides; and wherein the iron concentration in the catalyst is in the range of 0.5% to 40% by weight; and providing a sulfur oxide trap configured to capture sulfur oxides; supplying the sulfur-containing hydrocarbon fuel and the oxidant to the catalytic reactor; contacting the sulfur-containing hydrocarbon fuel and the oxidant with the sulfur oxidation catalyst; oxidizing sulfur-containing compounds in the hydrocarbon fuel using the oxidant and the sulfur oxidation catalyst; capturing sulfur oxides using the sulfur oxide trap; and providing desulfurized fuel to a component of the fuel cell system.

One embodiment of the present ~~invention~~ disclosure is a unique fuel cell system. Another embodiment is a unique desulfurization system. Yet another embodiment is a method of operating a fuel cell system. Other embodiments include apparatuses, systems, devices, hardware, methods, and combinations for fuel cell systems and desulfurization systems. Further embodiments, forms, features, aspects, benefits, and advantages of the present application will become apparent from the description and figures provided herewith.