CLAIMS:

1. A fuel cell system comprising:

a cathode;

a cathode conductor layer adjacent the cathode and positioned between the cathode and an oxidant gas stream;

an electrolyte separated from the cathode conductor layer by the cathode; and

an anode separated from the cathode by the electrolyte, wherein the anode, cathode conductor layer, cathode, and electrolyte are configured to form an electrochemical cell, ~~and~~ wherein ~~at least one of~~ the cathode and~~or~~ the cathode conductor layer includes~~s~~ an exsolute oxide that reacts with Cr vapor species present in the oxidant gas stream~~configured~~ to capture Cr vapor species ~~present in the fuel cell system~~, and wherein the cathode conductor layer includes more exsolute oxide than the cathode.

2. The fuel cell system of claim 1, wherein the cathode conductor layer is formed from an LSM material having A-site deficiencies, wherein the exsolute oxide in the cathode conductor layer comprises a manganese oxide exsolution resulting from equilibrium concentration of the LSM while the fuel cell operates.

~~3. The fuel cell system of claim 1, wherein the exsolute oxide captures Cr vapor species from a cathode gas stream by reacting with the Cr vapor species.~~

3~~4~~. The fuel cell system of claim 1, wherein the exsolute oxide comprises a manganese oxide.

4~~5~~. The fuel cell system of claim 1, wherein the cathode conductor layer includes an additional material other than that of the exsolute oxide that is also configured to also capture the Cr vapor species present in the fuel cell system.

56. The fuel cell system of claim 45, wherein the additional material comprises an alkaline earth oxide.

67. The fuel cell system of claim 1, wherein the cathode conductor layer functions as a primary conduction path and to capture the Cr vapor species present in the fuel cell system.

~~8. The fuel cell system of claim 1, wherein the cathode and cathode conductive layer includes the exsolute oxide configured to capture the Cr vapor species present in the fuel cell system.~~

~~9. The fuel cell system of claim 8, wherein the cathode conductor layer is configured to exsolute more free oxide than cathode layer.~~

710. The fuel cell system of claim 18, wherein the cathode functions as a reduction catalyst and to capture the Cr vapor species present in the fuel cell system.

811. The fuel cell system of claim 1, further comprising an additional layer deposited on an outer surface of the cathode conductor layer to capture the Cr vapor species present in the fuel cell system, and wherein the additional layer does not provide any required electronic conductance functionality to the fuel cell.

912. The fuel cell system of claim 811, wherein the additional~~composition of the third~~ layer comprises at least one of an alkaline earth metal oxide, transition metal oxide, or rare earth metal oxide~~element~~ which reacts with the Cr vapor species to capture the Cr vapor species in the additional layer.

1013. A method comprising forming a fuel cell system, the fuel cell system comprising:

a cathode;

a cathode conductor layer adjacent the cathode and positioned between the cathode and an oxidant gas stream;

an electrolyte separated from the cathode conductor layer by the cathode; and

an anode separated from the cathode by the electrolyte, wherein the anode, cathode conductor layer, cathode, and electrolyte are configured to form an electrochemical cell, wherein the cathode and cathode conductor layer includes an exsolute oxide that reacts with Cr vapor species present in the oxidant gas streamconfigured to capture Cr vapor species present in the fuel cell system, and wherein the cathode conductor layer includes more exsolute oxide than the cathode.

1114. The method of claim 1013, wherein the cathode conductor layer is formed from an LSM material having A-site deficiencies, wherein the exsolute oxide in the cathode conductor layer comprises a manganese oxide exsolution resulting from equilibrium concentration of the LSM while the fuel cell operates.

~~15 The method of claim 13, wherein the exsolute oxide captures Cr vapor species from a cathode gas stream by reacting with the Cr vapor species.~~

1216. The method of claim 1013, wherein the exsolute oxide comprises manganesean ~~alkaline earth~~ oxide.

1317. The method of claim 1013, wherein the cathode conductor layer includes an additional material other than that of the exsolute oxide that is also configured to also capture the Cr vapor species present in the fuel cell system.

1418. The method of claim 1317, wherein the additional material comprises an alkaline earth oxide.

15~~19~~. The method of claim 10~~13~~, wherein the cathode conductor layer functions as a primary conduction path and to capture the Cr vapor species present in the fuel cell system.

16. The method of claim 10, wherein the cathode functions as a reduction catalyst and to capture the Cr vapor species present in the fuel cell system.

17. The method of claim 10, wherein the fuel cell system comprises an additional layer deposited on an outer surface of the cathode conductor layer to capture the Cr vapor species present in the fuel cell system, and wherein the additional layer does not provide any required electronic conductance functionality to the fuel cell.

18. The method of claim 17, wherein the additional layer comprises at least one of an alkaline earth metal oxide, transition metal oxide, or rare earth metal oxide which reacts with the Cr vapor species to capture the Cr vapor species in the additional layer.

19~~20~~. A fuel cell system comprising:

a cathode;

a cathode conductor layer adjacent the cathode and positioned between the cathode and an oxidant gas stream;

an electrolyte separated from the cathode conductor layer by the cathode; and

an anode separated from the cathode by the electrolyte, wherein the anode, cathode conductor layer, cathode, and electrolyte are configured to form an electrochemical cell, and wherein ~~at least one of~~ the cathode conductor layer and the~~or~~ cathode include~~s~~ an exsolute oxide that reacts with Cr vapor species present in the oxidant gas stream~~configured~~ to capture Cr vapor species present in the fuel cell system, wherein the cathode conductor layer is formed from an LSM material having A-site deficiencies, ~~and~~ wherein the exsolute oxide comprises a manganese oxide exsolution resulting from equilibrium concentration of the LSM while the fuel cell operates, and wherein the cathode conductor layer includes more exsolute oxide than the cathode.