CLAIMS:

1. A fuel cell comprising:

a cathode;

an electrolyte; and

a reduced anode separated from the cathode by the electrolyte, wherein the reduced anode includes a Ni metal phase constitution dispersed in a $(La_{1-x}Sr_x)_{n+1}Mn_nO_{3n+1}$ compound having a Mn-based Ruddlesden-Popper (R-P) phase constitution, wherein n is equal to or greater than one, and wherein the anode, cathode, and electrolyte are configured to form an electrochemical cell.

2. The fuel cell of claim 1, wherein the Ni metal phase constitution dispersed in the $(La_{1-x}Sr_x)_{n+1}Mn_nO_{3n+1}$ compound having a Mn-based R-P phase constitution, of n greater than or equal to 1, is formed via a reduction of a Mn and Ni mixed B-site compound having a perovskite structure or Ruddlesden-Popper compound that is present following an initial anode processing step.

3. The fuel cell of claim 2, wherein the Mn and Ni mixed B-site compound comprises a $(La_{1-x}Sr_x)(Mn_{1-x}Ni_x)O_3$ compound.

4. The fuel cell of claim 2, wherein the Mn and Ni mixed B-site compound comprises a $(La_{1-x}Sr_x)_{n+1}(Ni_{1-x}Mn_x)_nO_{3n+1}$ Ruddlesden-Popper compound.

5. The fuel cell of claim 1, wherein the reduced anode includes between approximately 82 and approximately 95 wt% of the $(La_{1-x}Sr_x)_{n+1}Mn_nO_{3n+1}$ compound having the Mn-based R-P phase constitution and between 5-18 wt% of the Ni metal phase constitution.

6. The fuel cell of claim 1, wherein the reduced anode further includes an ionic phase including yttria and/or scandia stabilized zirconia or rare-earth oxide stabilized ceria dispersed in the Ni metal phase and $(La_{1-x}Sr_x)_{n+1}Mn_nO_{3n+1}$ Mn-based R-P phase, wherein the ionic phase is present in an amount of 35 weight percent to 65 weight percent.

7. The fuel cell of claim 1, wherein the anode consists essentially of the Ni metal phase constitution dispersed in the $(La_{1-x}Sr_x)_{n+1}Mn_nO_{3n+1}$ compound having the Mn-based R-P phase constitution.

8. A method for forming a fuel cell, the fuel cell including:

a cathode;

an electrolyte; and

a reduced anode separated from the cathode by the electrolyte;

the method comprising:

forming an initial anode in an air environment, wherein the initial anode comprises a Mn and Ni mixed B-site compound having a perovskite structure or a Ruddlesden-Popper compound when initially formed; and

reducing the Mn and Ni mixed B-site compound having a perovskite structure or a Ruddlesden-Popper compound in a fuel environment to form a reduced anode;

wherein the composition of the initial anode is such that the reduced anode includes a Ni metal phase constitution dispersed in a $(La_{1-x}Sr_x)_{n+1}Mn_nO_{3n+1}$ compound having a Mn-based Ruddlesden-Popper (R-P) phase constitution, wherein n is equal to or greater than one, and wherein the anode, cathode, and electrolyte are configured to form an electrochemical cell.

9. The method of claim 8, wherein the Mn and Ni mixed B-site compound comprises a $(La_{1-x}Sr_x)(Mn_{1-x}Ni_x)O_3$ compound.

10. The method of claim 8, wherein the Mn and Ni mixed B-site compound comprises a $(La_{1-x}Sr_x)_{n+1}(Ni_{1-x}Mn_x)_nO_{3n+1}$ Ruddlesden-Popper compound.

11. The method of claim 8, wherein the reduced anode includes between 82 and 95 wt% of the $(La_{1-x}Sr_x)_{n+1}Mn_nO_{3n+1}$ compound having the Mn-based R-P phase constitution and between 5-18 wt% of the Ni metal phase.

12. The method of claim 8, further comprising adding an ionic phase including yttria and/or scandia stabilized zirconia or rare-earth oxide stabilized ceria to the Ni metal phase and $(La_{1-x}Sr_x)_{n+1}Mn_nO_{3n+1}$ Mn-based R-P phase, wherein the reduced anode includes the ionic phase in an amount of 35 weight percent to 65 weight percent.

13. The method of claim 8, wherein the reduced anode consists essentially of the Ni metal phase constitution and the $(La_{1-x}Sr_x)_{n+1}Mn_nO_{3n+1}$ compound having the Mn-based R-P phase constitution.

14. The method of claim 8, further comprising forming an anode conductive layer adjacent the anode, wherein the anode conductive layer comprises a cermet, where the metal phase in the cermet comprises Ni.