CLAIMS:

What is claimed is:

1. A fuel cell stack, comprising:

a cathode input manifold adjacent to a cathode input side of the fuel cell stack;

an anode input manifold adjacent to an anode input side of the fuel cell stack that is different from the cathode input side;

a cathode output manifold adjacent to a cathode output side of the fuel cell stack that is different from the cathode input side and the anode input side;

a fuel cell comprising:

an anode comprising an anode inlet located on the anode inlet side of the fuel cell stack, an extended edge seal input chamber, and an anode active area, the anode inlet being in fluid communication with the anode input manifold, the extended edge seal input chamber being located on the cathode input side or the cathode output side, and the extended edge seal input chamber being in fluid communication with the anode input and the anode active area through an anode active area inlet, wherein the anode active area inlet is located on the cathode input side or the cathode output side;

a cathode comprising a cathode inlet and a cathode active area, the cathode inlet being substantially parallel to the anode inlet;

an electrolyte matrix layer separating the anode and the cathode; and

an inlet baffle located adjacent to the anode active area inlet, the inlet baffle comprising a plurality of inlet baffle apertures at an inlet boundary between the extended edge seal input chamber and the anode inlet, at least a portion of the fluid communication between the extended edge seal input chamber and the anode inlet comprising fluid flow through the plurality of inlet baffle apertures, a length of the inlet baffle comprising at least 60% of a length of the inlet boundary, an average height of the inlet baffle comprising 100% or more of an average height along the inlet boundary, a combined cross-sectional area of the plurality of inlet baffle apertures comprising 0.5% to 6.0% of a total cross-sectional area at the inlet boundary.

2. The fuel cell stack of claim 1, wherein at least one of the plurality of inlet baffle apertures has a characteristic dimension of 0.25 mm or more; or wherein each of the plurality of inlet baffle apertures has a characteristic dimension of 0.25 mm or more.

3. The fuel cell stack of claim 1, wherein the combined cross-sectional area of the plurality of inlet baffle apertures is 0.5% to 2.5% of the total cross-sectional area at the inlet boundary; or wherein a length of the inlet baffle is less than the length of the inlet boundary by 0.05% to 5.0% of the length of the inlet boundary; or a combination thereof.

4. The fuel cell stack of claim 1, wherein the length of the inlet baffle comprises the length of the inlet boundary.

5. The fuel cell stack of claim 1, further comprising:

an anode outlet in fluid communication with an anode outlet manifold the anode outlet in fluid communication with an anode flow field;

an outlet baffle comprising a plurality of outlet baffle apertures at an outlet boundary between the anode active area and the anode outlet manifold, at least a portion of the fluid communication between the anode active area and the anode outlet manifold comprising fluid flow through the plurality of outlet baffle apertures, a length of the outlet baffle comprising at least 60% of a length of the outlet boundary, an average height of the outlet baffle comprising 100% or more of an average height along the outlet boundary, a combined cross-sectional area of the plurality of outlet baffle apertures comprising 0.5% to 6.0% of a total cross-sectional area at the outlet boundary.

6. The fuel cell stack of claim 5, wherein the combined cross-sectional area of the plurality of inlet baffle apertures is different from the combined cross-sectional area of the plurality of outlet baffle apertures; or wherein one or more inlet baffle apertures comprise a different characteristic dimension than one or more outlet baffle apertures; or wherein a length of the inlet baffle is different than a length of the outlet baffle; or a combination thereof.

7. The fuel cell stack of claim 1, wherein apertures in a portion of the inlet baffle that is farthest from the anode inlet comprise 25% or more of the combined cross-sectional area of the inlet baffle apertures, the portion of the inlet baffle comprising 5% to 20% of a length of the inlet boundary.

8. The fuel cell stack of claim 1, wherein the extended edge seal input chamber is configured to receive anode inlet gas provided to the fuel cell stack from the anode input manifold in a first direction relative to the fuel cell stack and output the anode inlet gas into the anode inlet in a second direction substantially perpendicular to the first direction.

9. The fuel cell stack of claim 1, further comprising: a second extended edge seal chamber extending away from the active anode area on a side opposite the anode inlet, wherein the second extended edge seal chamber is configured to receive an anode process gas and divert the anode process gas to an anode outlet manifold.

10. The fuel cell stack of claim 1, wherein the anode active area comprises a reforming catalyst.

11. The fuel cell stack of claim 1, wherein the inlet baffle comprises a V-shaped baffle having a first side and a second side, and wherein apertures in the first side have at least one of a different aperture size and a different aperture pattern relative to apertures in the second side.

12. A fuel cell stack comprising:

a cathode input manifold adjacent to a cathode input side of the fuel cell stack;

an anode input manifold adjacent to an anode input side of the fuel cell stack that is different from the cathode input side;

a cathode output manifold adjacent to a cathode output side of the fuel cell stack that is different from the cathode input side and the anode input side;

a fuel cell comprising:

an anode comprising an anode inlet located on the anode inlet side of the fuel cell stack, an extended edge seal input chamber, and an anode active area, the anode inlet being in fluid communication with the anode input manifold, the extended edge seal input chamber being located on the cathode input side or the cathode output side, and the extended edge seal input chamber being in fluid communication with the anode input and the anode active area through an anode active area inlet, wherein the anode active area inlet is located on the cathode input side or the cathode output side;

a cathode comprising a cathode inlet and a cathode active area, the cathode inlet being substantially parallel to the anode inlet;

an electrolyte matrix layer separating the anode and the cathode; and

an inlet baffle located adjacent to the anode active area inlet, the inlet baffle comprising a plurality of inlet baffle apertures at an inlet boundary between the extended edge seal input chamber and the anode inlet, at least a portion of the fluid communication between the extended edge seal input chamber and the anode inlet comprising fluid flow through the plurality of inlet baffle apertures, a length of the inlet baffle comprising at least 60% of a length of the inlet boundary, an average height of the inlet baffle comprising 100% or more of an average height along the inlet boundary, a combined cross-sectional area of the plurality of inlet baffle apertures comprising 0.5% to 6.0% of a total cross-sectional area at the inlet boundary.

13. The fuel cell stack of claim 12, wherein the combined cross-sectional area of the plurality of inlet baffle apertures is 0.5% to 2.5% of the total cross-sectional area at the inlet boundary; or wherein a length of the inlet baffle is less than a length of the inlet boundary by 0.05% to 5.0% of the length of the inlet boundary; or a combination thereof.

14. The fuel cell stack of claim 12, wherein apertures in a portion of the inlet baffle that is farthest from the anode inlet comprise 25% or more of the combined cross-sectional area of the inlet baffle apertures, the portion of the inlet baffle comprising 5% to 20% of a length of the inlet boundary.

15. The fuel cell stack of claim 12, wherein at least one of the plurality of inlet baffle apertures has a characteristic dimension of 0.25 mm or more; or wherein each of the plurality of inlet baffle apertures has a characteristic dimension of 0.25 mm or more.

16. The fuel cell stack of claim 12, further comprising

an outlet baffle located adjacent to an anode active area outlet comprising a plurality of outlet baffle apertures, a cross-sectional area of the plurality of outlet baffle apertures being 0.5% to 6.0% of a total cross-sectional flow field area at an outlet boundary.

17. The fuel cell stack of claim 16, wherein the cross-sectional area of the plurality of outlet baffle apertures is 0.5% to 2.5% of the total cross-sectional area at the outlet boundary; or wherein a length of the outlet baffle is less than a length of the outlet boundary by 0.05% to 5.0% of the length of the outlet boundary; or a combination thereof.