CLAIMS

What is claimed is:

1. A method for producing electricity in a molten carbonate fuel cell comprising a lithium-containing electrolyte, the method comprising: operating a molten carbonate fuel cell comprising an anode, a matrix, and a cathode with a cathode input stream comprising 10 vol % or less of CO_2 at an average current density of 120 mA/cm^2 or more and a CO_2 utilization of 60% or more, the molten carbonate fuel cell further comprising a combined target electrolyte fill level of 70 vol % or more of a combined matrix pore volume and cathode pore volume.

2. The method of claim 1, wherein operating the molten carbonate fuel cell comprises operating at a measured CO_2 utilization of 75% or more.

3. The method of claim 1, wherein the cathode input stream comprises 5.0 vol % or less of CO_2, or wherein a cathode exhaust comprises 2.0 vol % or less of CO_2, or wherein the molten carbonate fuel cell is operated at a transference of 0.95 or less, or a combination of two or more thereof.

4. The method of claim 1, wherein the electrolyte comprises a non-eutectic mixture, or wherein a lithium carbonate content of the electrolyte is greater than a corresponding eutectic composition by 10 wt % or more.

5. The method of claim 1, wherein the current density is 150 mA/cm^2 or more.

6. The method of claim 1, wherein the molten carbonate fuel cell is operated for a cumulative time of 50 hours or more.

7. The method of claim 1, wherein a target cathode electrolyte fill level comprises 85 vol % to 140 vol % of the cathode pore volume.

8. The method of claim 1, wherein the combined target electrolyte fill level is 85 vol% to 128 vol%.

9. The method of claim 1, wherein at least a portion of the electrolyte is stored in a cathode collector.