WHAT IS CLAIMED IS:

1. A method comprising:

augmenting a production line with an electrolyzer comprising an electrolyte, wherein: (i) the production line is a hydrogen production line; (ii) the production line includes a syngas production system; and (iii) the electrolyte of the electrolyzer is a concentrated alkaline solution;

separating a volume of carbon monoxide from the production line, after the syngas production system, using a separation system;

supplying, after separating the volume of carbon monoxide using the separation system, the volume of carbon monoxide to a cathode area of the electrolyzer; and

generating, using the volume of carbon monoxide and the electrolyzer, a volume of generated chemicals;

wherein the volume of generated chemicals is at least one of: a volume of hydrocarbons, a volume of organic acids, a volume of alcohol, a volume of olefins and a volume of N-rich organic compounds; and

wherein the separation system separates out the volume of carbon monoxide from carbon dioxide and other impurities before the volume of carbon monoxide is supplied to the cathode area of the electrolyzer.

2. The method of claim 1, wherein:

a feedstock for the syngas production system is a volume of natural gas.

3. The method of claim 2, wherein:

the syngas production system conducts a steam methane reforming process on a volume of natural gas to produce a volume of syngas; and

no carbon monoxide from the volume of syngas is used in a water gas shift reaction.

4. The method of any one of claims 1 to 3, wherein:
the syngas production system includes a gasification process; and
a feedstock for the gasification process is at least one of biomass and waste.

5. The method of any one of claims 1 to 4, further comprising:
supplying a volume of carbon dioxide to be used in the syngas production system.

6. The method of claim 5, wherein:
the volume of carbon dioxide is obtained from a water gas shift reaction conducted on a second volume of carbon monoxide from the syngas production system.

7. The method of any one of claims 1 to 6, wherein the generating using the volume of carbon monoxide and the electrolyzer comprises:
supplying the volume of carbon monoxide to the cathode area of the electrolyzer as a cathodic input fluid; and
supplying a volume of electrolyte to an anode area of the electrolyzer as an anodic input fluid.

8. The method of claim 7, further comprising:
supplying a volume of oxygen generated by the electrolyzer from an anodic output to the syngas production system; and
wherein the syngas production system conducts one of an oxidation process and a partial oxidation process.

9. The method of any one of claims 1 to 8, further comprising:
providing a volume of dihydrogen; and
wherein the generating of the volume of generated chemicals comprises:

supplying the volume of carbon monoxide to a cathode area of the electrolyzer as a cathodic input fluid; and

supplying the volume of dihydrogen to an anode area of the electrolyzer as an anodic input fluid.

10. The method of claim 9, wherein:

the volume of dihydrogen includes a parasitic dihydrogen output of the cathode area; and

the parasitic dihydrogen output is circulated from a cathodic output of the electrolyzer to an anodic input of the electrolyzer.

11. The method of claim 9 or claim 10, wherein the separating of the volume of carbon monoxide comprises:

(i) supplying a volume of syngas from the syngas production system to a separation system; and

(ii) separating the volume of dihydrogen and the volume of carbon monoxide from the volume of syngas using the separation system.

12. The method of any one of claims 1 to 11, further comprising:

supplying a volume of water to an anode area of the electrolyzer as an anodic input fluid; and

wherein the cathode area has a copper-based catalyst.

13. The method of any one of claims 1 to 12, wherein:

the electrolyzer comprises at least one separating element selected from: an ion-conducting polymeric separator, a non-ion conducting polymeric separator, a diaphragm, a ceramic-containing material, a non-charged separator scaffold, and a mixed ceramic-organic compound separator.

14. The method of any one of claims 1 to 13, wherein:

the volume of generated chemicals includes a volume of gaseous hydrocarbon and a volume of liquid alcohol.

15. The method of any one of claims 1 to 14, wherein:

the volume of generated chemicals includes a volume of gaseous hydrocarbon and a volume of organic acid.

16. The method of any one of claims 1 to 15, further comprising:

mixing the volume of carbon monoxide with a volume of at least one additive chemical; and

wherein the volume of carbon monoxide has been mixed with the volume of at least one additive chemical when the volume of carbon monoxide is supplied to the electrolyzer.

17. The method of claim 16, wherein:

the volume of at least one additive chemical includes water.

18. The method of claim 16 or claim 17, wherein:

the volume of additive chemical is one of an imines, amines, nitrogen oxides and ammonia; and

the volume of generated chemicals is a volume of amino acids.

19. A method comprising:

augmenting a production line with an electrolyzer comprising an electrolyte, wherein: (i) the production line is a hydrogen production line; (ii) the production line includes a

reforming process; and (iii) the electrolyte of the electrolyzer is a concentrated alkaline solution;

supplying a volume of carbon dioxide and a volume of natural gas to a reforming process;

separating a volume of carbon monoxide from the production line, after the reforming process, using a separation system;

supplying, after separating the volume of carbon monoxide using the separation system, the volume of carbon monoxide to a cathode area of the electrolyzer; and

generating, using the volume of carbon monoxide and the electrolyzer, a volume of generated chemicals; and

wherein: (i) the reforming process consumes the volume of carbon dioxide; and (ii) the separation system separates out the volume of carbon monoxide from the carbon dioxide and other impurities before the volume of carbon monoxide is supplied to the cathode area of the electrolyzer.