1. A method for preparing oxygenated hydrocarbons, comprising:

a) supplying to a reactor a first heated hydrocarbon-containing gas stream;

b) supplying separately to the reactor an oxygen-containing gas stream to form a reaction mixture, the oxygen-containing gas stream being prepared by passing air through one or more oxygen-enriching membranes to increase oxygen content, to partially oxidize the first heated hydrocarbon-containing gas stream in a partial oxidation reaction;

c) separating and/or condensing one or more oxygenated hydrocarbons from a product stream;

d) removing non-hydrocarbon gases from the product stream to enrich a gaseous hydrocarbon fraction using a scrubber and/or a hydrocarbon-enriching membrane; and

e) mixing remaining gaseous hydrocarbon product from the product stream with a fresh first heated hydrocarbon-containing gas stream after one reaction cycle;

wherein at least one membrane is used to increase oxygen content within step (b) and/or to remove non-hydrocarbon gases within step (d).

2. The method of claim 1, wherein within (b) one or more membranes are used to increase the oxygen content of the oxygen-containing gas stream entering the reactor.

3. The method of claim 2, wherein the oxygen-containing gas stream entering the reactor comprises between 20% and 100% oxygen.

4. The method of claim 2, wherein the oxygen-containing gas stream entering the reactor comprises less than 80% nitrogen.

5. The method of claim 2, wherein multiple membranes are used in series.

6. The method of claim 1, wherein within (d) the hydrocarbon-enriching membrane is used to remove non-hydrocarbon gases.

7. The method of claim 6, wherein, following separation of non-hydrocarbon gases using the hydrocarbon-enriching membrane, a resulting gas comprises a gaseous hydrocarbon fraction.

8. The method of claim 6, wherein the one or more gases including at least one of carbon monoxide, carbon dioxide, hydrogen and nitrogen.

9. The method of claim 1, wherein within (d) the hydrocarbon-enriching membrane and the scrubber are both used to remove non-hydrocarbon gases.

10. The method of claim 9, wherein the scrubber is used to remove carbon oxides.

11. The method of claim 1, wherein within (d) the hydrocarbon-enriching membrane, but not the scrubber, is used to remove non-hydrocarbon gases.

12. The method of claim 1, wherein one or more separated non-hydrocarbon gases are converted to a hydrocarbon which may be used as part of the first heated hydrocarbon-containing gas stream.

13. The method of claim 12, wherein the one or more separated non-hydrocarbon gases include carbon monoxide, carbon dioxide, and/or hydrogen.

14. The method of claim 1, wherein one or more separated non-hydrocarbon gases are converted to an oxygenated hydrocarbon product.

15. The method of claim 14 wherein the one or more separated non-hydrocarbon gases include carbon monoxide, carbon dioxide, and/or hydrogen.

16. The method of claim 1, further comprising supplying a second hydrocarbon-containing gas stream to the reactor downstream of the first heated hydrocarbon-containing gas stream and the oxygen-containing gas stream at a temperature below that of the first heated hydrocarbon-containing gas stream.

17. The method of claim 16, wherein the second hydrocarbon-containing gas stream is supplied to the reactor at a temperature of 0 ˚C to 100 ˚C.

18. The method of claim 16, wherein the second hydrocarbon-containing gas stream is adjusted to mitigate decomposition of formaldehyde in the reactor.

19. The method of claim 18, wherein the temperature of the reaction mixture is reduced by at least 30° C within a reaction vessel.

20. The method of claim 1, wherein the oxidation is partial oxidation without a catalyst, and wherein the mixture is substantially homogeneous.

21. The method of claim 1, wherein heat is transferred from the product stream to the first heated hydrocarbon-containing gas stream.

22. The method of claim 1, wherein oxidation occurs at pressures from about 5 to 9 MPA.

23. The method of claim 1, wherein oxidation is carried out in the reactor at a temperature between about 430° C. and 470° C.

24. The method of claim 1, wherein the first heated hydrocarbon-containing gas stream entering during a first cycle contains one or more non-hydrocarbon gases which may be removed by the scrubber and/or the hydrocarbon-enriching membrane following the partial oxidation reaction.

25. A system comprising:

a reactor;

a first hydrocarbon-containing gas supply means for supplying into the reactor a heated hydrocarbon-containing gas;

a means for supplying into the reactor an oxygen-containing gas;

one or more oxygen-enriching membranes to increase oxygen content of the oxygen-containing gas supplied into the reactor;

a means for separating and/or condensing one or more liquid oxygenated hydrocarbons from a product stream;

a scrubber and/or a hydrocarbon-enriching membrane to remove non-hydrocarbon gases from the product stream; and

a means for mixing remaining gaseous hydrocarbon product from the product stream with a fresh first heated hydrocarbon-containing gas stream after one reaction cycle, the system having at least one membrane.

26. The system of claim 25, comprising one or more membranes to increase oxygen content of the oxygen-containing gas supplied into the reactor.

27. The system of claim 26, comprising multiple membranes in series.

28. The system of claim 25, comprising the hydrocarbon-enriching membrane to remove non-hydrocarbon gases from the product stream.

29. The system of claim 28, further comprising a scrubber to remove carbon oxides from the product stream.

30. The system of claim 25, comprising one or more oxygen-enriching membranes to increase oxygen content of the oxygen-containing gas supplied into the reactor and the hydrocarbon-enriching membrane to remove non-hydrocarbon gases from the product stream.

31. The system of claim 25, also comprising a second hydrocarbon-containing gas supply means downstream of the heated hydrocarbon-containing gas and the oxygen-containing gas at a temperature below that of the heated hydrocarbon-containing gas.

32. The system of claim 25, including a heat exchange means for transferring heat from the product stream to the heated hydrocarbon-containing gas.

33. The system of claim 32, further comprising a heater disposed between the heat exchange means and the reactor for further preheating the heated hydrocarbon-containing gas prior to entry into the reactor.

34. The system of claim 25, further comprising a condenser that condenses a relatively low volatility component of the product stream for separation from a relatively high volatility component of the product stream.

35. A method of producing methanol, comprising:

supplying to a reactor a first heated hydrocarbon-containing gas stream;

supplying separately to the reactor an oxygen-containing gas stream, prepared by passing air through one or more membranes to increase oxygen content, to oxidize the first heated hydrocarbon-containing gas stream to form a product stream;

separating and condensing one or more oxygenated hydrocarbons including methanol from the product stream;

removing carbon monoxide and/or carbon dioxide from the product stream comprising one or more oxygenated hydrocarbons using a scrubber and a membrane; and

mixing remaining gaseous hydrocarbon product from the product stream with the first hydrocarbon-containing gas stream after one reaction cycle.