CLAIMS:

1. A process for removing water from a gaseous feed stream, the process comprising performing a rapid cycle swing adsorption process by:

a) performing an adsorption step, wherein the adsorption step comprises passing a gaseous feed stream through an adsorbent bed unit having a substantially parallel channel contactor to separate water from the gaseous feed stream to form a product stream, wherein the substantially parallel channel contactor comprises an adsorbent material being a zeolite 3A having (i) a K to Al atomic ratio is in a range between 0.3 and 1.0; and (ii) a Si to Al atomic ratio is in a range between 1.0 and 1.2;

b) interrupting the flow of the gaseous feed stream;

c) performing a regeneration step, wherein the regeneration step comprises removing at least a portion of the water from the substantially parallel channel contactor; and

d) repeating the steps a) to c) for at least one additional cycle;

wherein mass average size of zeolite aggregates in the zeolite 3A are less than 10 microns;

wherein the rapid cycle swing adsorption process is a rapid cycle pressure swing adsorption process, and residence time for gas in the gaseous feed stream contacting the adsorbent material in the substantially parallel channel contactor during the adsorption step is less than 2.5 seconds; and

wherein the process dehydrates the gaseous feed stream.

2. The process of claim 1, wherein the regeneration step further comprises performing a purge step, wherein the purge step comprises passing a purge stream into the adsorbent bed unit to remove the at least a portion of the water from the substantially parallel channel contactor to form a purge product stream.

3. The process of claim 1 or claim 2, further comprising performing one or more depressurization steps after step b) and prior to step c), wherein the pressure within the

adsorbent bed unit is reduced by a predetermined amount with each successive depressurization step.

4. The process of any one of the claims 1 to 3, wherein the feed pressure is in the range between 400 pounds per square inch absolute (psia) and 1500 psia.

5. The process of any one of the claims 1 to 4, wherein the gaseous feed stream comprises hydrocarbons and H_2O, wherein the H_2O is in the range of two parts per million volume to saturation levels in the gaseous feed stream.

6. The process of any one of the claims 1 to 4, wherein the gaseous feed stream is a hydrocarbon containing stream having greater than one volume percent hydrocarbons based on the total volume of the feed stream.

7. The process of any one of the claims 1 to 6, wherein the cycle duration is greater than 2 seconds and less than 300 seconds.

8. The process of any one of the claims 1 to 7, wherein residence time for gas in the gaseous feed stream contacting the adsorbent material in the substantially parallel channel contactor during the adsorption step is less than 0.5 seconds.

9. The process of any one of the claims 1 to 7, wherein residence time for gas in the gaseous feed stream contacting the adsorbent material in the substantially parallel channel contactor during the adsorption step is less than 0.1 seconds.

10. The process of any one of the claims 1 to 9, wherein the concentration of water in the product stream is less than 50 parts per million on a mole basis.

11. The process of any one of the claims 1 to 9, wherein the concentration of water in the product stream is less than 1 parts per million on a mole basis.

12. The process of any one of the claims 1 to 9, wherein the concentration of water in the product stream is less than 0.1 parts per million on a mole basis.

13. The process of claim 2, wherein the purge stream is predominately methane.

14. A cyclical rapid cycle swing adsorbent system for removing water from a gaseous feed stream, the rapid cycle swing adsorbent system comprising one or more adsorbent bed units that each comprise:

a housing forming an interior region;

a substantially parallel channel contactor disposed within the interior region of the housing, wherein the substantially parallel channel contactor comprises an adsorbent material being a zeolite 3A having (i) a K to Al atomic ratio is in a range between 0.3 and 1.0; and (ii) a Si to Al atomic ratio is in a range between 1.0 and 1.2;

a plurality of valves secured to the housing, wherein each of the plurality of valves is in flow communication with a conduit and configured to control fluid flow along a flow path extending from a location external to the housing through the conduit and to the substantially parallel channel contactor through the valve;

wherein mass average size of zeolite aggregates in the zeolite 3A are less than 10 microns;

wherein the rapid cycle swing adsorption system is configured for a rapid cycle pressure swing adsorption process, and the rapid cycle swing adsorption system is configured for a residence time for gas in the gaseous feed stream contacting the adsorbent material in the substantially parallel channel contactor during the adsorption step is less than 2.5 seconds; and

wherein the rapid cycle swing adsorption system is configured to perform a rapid cycle pressure swing adsorption process to dehydrate a gaseous feed stream.

15. The cyclical rapid cycle swing adsorbent system of claim 14, wherein the housing is configured to maintain a pressure within the range between 400 pounds per square inch absolute (psia) and 1500 psia.

16. The cyclical rapid cycle swing adsorbent system of claim 14 or claim 15, wherein the rapid cycle swing adsorption system is configured to perform for a cycle duration that is greater than 2 seconds and less than 300 seconds.

17. The cyclical rapid cycle swing adsorbent system of any one of the claims 14 to 16, wherein the rapid cycle swing adsorption system is configured to provide a residence time for gas in the gaseous feed stream contacting the adsorbent material in the substantially parallel channel contactor during the adsorption step being less than 0.5 seconds.

18. The cyclical rapid cycle swing adsorbent system of any one of the claims 14 to 17, wherein the rapid cycle swing adsorption system is configured to provide a product stream having a concentration of water in the product stream is less than 50 parts per million on a mole basis.

19. The cyclical rapid cycle swing adsorbent system of any one of the claims 14 to 17, wherein the rapid cycle swing adsorption system is configured to provide a product stream having a concentration of water in the product stream is less than 1 parts per million on a mole basis.

20. The process of any one of claims 1 to 13 or the cyclical rapid cycle swing adsorbent system of any one of the claims 14 to 19, wherein the adsorbent material has greater than 50% of the non-potassium cations in the zeolite 3A are Na.

21. The process of any one of claims 1 to 13 or the cyclical rapid cycle swing adsorbent system of any one of the claims 14 to 19, wherein the adsorbent material has greater than 80% of the non-potassium cations in the zeolite 3A are Na.

22. The process of any one of claims 1 to 13 or the cyclical rapid cycle swing adsorbent system of any one of the claims 14 to 19, wherein the adsorbent material has greater than 90% of the non-potassium cations in the zeolite 3A are Na.

23. The process of any one of claims 1 to 13 or 20 to 22 or the cyclical rapid cycle swing adsorbent system of any one of the claims 14 to 22, wherein the adsorbent material is fouling tolerant, wherein fouling tolerant is defined as the adsorbent material having a CO_2 capacity at 25 °C and less than 3 minute equilibration times in isotherm measurement of less than 2 milli moles/gram at 760 torr.

24. The process of any one of claims 1 to 13 or 20 to 22 or the cyclical rapid cycle swing adsorbent system of any one of the claims 14 to 22, wherein the adsorbent material is fouling tolerant, wherein fouling tolerant is defined as the adsorbent material having a CO_2 capacity at 25 °C and less than 3 minute equilibration times in isotherm measurement of less than 0.5 milli moles/gram at 760 torr.

25. The process of any one of claims 1 to 13 or 20 to 24, or the cyclical rapid swing adsorbent system of any one of claims 14 to 24, wherein the zeolite 3A comprise very good quality crystals.

26. The process of any one of claims 1 to 13 or 20 to 24, or the cyclical rapid swing adsorbent system of any one of claims 14 to 24 or the substantially parallel channel contactor of claim 34, wherein the zeolite 3A comprise excellent quality crystals.

27. The process of any one of claims 1 to 13 or 20 to 26, or the cyclical rapid swing adsorbent system of any one of claims 14 to 26, wherein the adsorbent material has the K to Al atomic ratio is in a range between 0.35 and 0.98.

28. The process of any one of claims 1 to 13 or 20 to 26 or the cyclical rapid swing adsorbent system of any one of claims 14 to 26, wherein the adsorbent material has the K to Al atomic ratio is in a range between 0.4 and 0.8.

29. The process of any one of claims 1 to 13 or 20 to 28, or the cyclical rapid swing adsorbent system of any one of claims 14 to 28, wherein mass average size of zeolite aggregates in the zeolite 3A are less than 5 microns.