Claims

What is claimed is:

1. A system comprising:
   a. a disposable reaction container;
   b. at least one heat transfer system;
   c. ~~optionally~~ a jacketed tank head positioned above the disposable reaction container;
   d. ~~optionally~~ a coalescer comprising an internal tortuous fluidic pathway and exhaust gas;
   e. an exhaust line leading from the coalescer to an ~~at least one~~ exhaust filter; ~~and,~~
   f. a heated air source that introduces heated air from a heated air source through a fluidic pathway into the exhaust gas to produce a mixed exhaust gas having a relative humidity of the less than that of the exhaust gas; and,
   ~~f.~~g. at least one exhaust filter through which mixed exhaust gas exits the system;
   wherein:
      the reaction container can comprise a first zone comprising a reaction mixture maintained at a first temperature;
      the reaction container can comprise a second zone comprising a headspace above the reaction mixture into which humid gas migrating from the reaction mixture can migrate;
      the second zone can be maintained at a second temperature lower than that of the first temperature;
      fluid migrating from the second zone ~~may~~ coalesces within the internal tortuous fluidic pathway of the coalescer~~, when present~~; and,
      the mixed exhaust gas is produced in a fluidic pathway leading to the exhaust filter or within a container that contains the exhaust filter;
      the mixed exhaust gas exits the reaction container and then exits the system through the exhaust filter~~;~~
      ~~the heated air source introduces heated air into the exhaust gas to produce a mixed exhaust gas after it exits the reaction container and prior to or concurrent with its exit from the system through the exhaust filter~~.

2. The system of claim 1 wherein the heated air source introduces air into the exhaust gas after it exits the reaction container and prior to its exit of the system through the exhaust

filter.

3. The system of claim 1 or 2 wherein the system comprises the coalescer through which the exhaust gas traverses, and the heated air source introduces air into the exhaust gas after it exits the coalescer to produce the mixed exhaust gas, which then exits the system through the exhaust filter.

4. The system of claim 1 or 2 wherein the relative humidity of the mixed exhaust gas is less than that of the exhaust gas.

5. The system of claim 1 wherein:

~~a) the reaction container is a disposable reaction container;~~

~~b)~~a) the system further comprises a reaction vessel comprising a heat transfer system;

~~c)~~b) the system comprises a jacketed tank head integral with a reaction vessel in which the reaction system is contained;

~~d)~~c) the system comprises a coalescer; the disposable reaction container comprises first and second zones, the first zone comprising a reaction mixture and the second zone comprising a headspace into which humid gas migrates from the first zone; the first zone is maintained at a first temperature; the second zone at a second temperature lower than the first temperature; and, fluid migrating from the headspace coalesces within the internal fluidic channel of the coalesce;

~~e)~~d) heat transfer is accomplished by radiative, convective, conductive or direct contact, and/or the heat transfer fluid is gas and/or liquid;

~~f)~~e) the disposable reaction container comprises first and second zones, the first zone comprising a reaction mixture and the second zone comprising a headspace into which humid gas migrates from the first zone, and a first heat transfer system associated with the first zone and a second heat transfer system associated with the second zone;

~~g)~~f) the system comprises a jacketed tank head; and the disposable reaction container comprises first and second zones, a first heat transfer system associated with the first zone, a second heat transfer system associated with the second zone, and a third heat transfer system is provided by the jacketed tank head that is optionally is in fluidic communication with the first and/or second heat

transfer systems, at least two of the heat transfer systems are contiguous with one another, at least one of the heat transfer systems is not contiguous with at least one other heat transfer system, at least two of the heat transfer systems are interconnected by a fluidic pathway, the second and third heat transfer system are interconnected, and/or the same type of heat transfer fluid is in each heat transfer system;

~~h)~~g) the second zone is positioned above the first zone;

~~i)~~h) the system comprises a jacketed tank head and the second zone is partially defined by an upper exterior surface adjacent to the jacketed tank head;

~~j)~~i) the system comprises a coalescer wherein: the coalescer comprises upper and lower surfaces and the internal tortuous fluidic pathway is contiguous with the either of both of said upper and/or lower surfaces, the coalescer is comprised of at least two pieces of flexible material fused together to form a chamber comprising the internal tortuous fluidic pathway, the internal tortuous fluidic pathway is defined by fused sections of the at least two pieces of flexible material, and/or the internal tortuous fluidic pathway is defined by a third material contained within the chamber;

~~k)~~j) the system comprises a coalescer further comprises at least one anti-foam device positioned between the disposable reaction container and the coalescer;

~~l)~~k) the system comprises a heat transfer system comprising at least one baffle comprising a first sub-assembly consisting essentially of a first material adjoined to a second material to form a first distribution channel; a second sub-assembly consisting essentially of a first material adjoined to a second material to form a second distribution channel; optionally a closure bar that adjoins the first assembly and the second sub-assembly to one another; and, a relief channel between the first sub-assembly and the second sub-assembly; wherein the closure bar, when present, sets the width of the relief channel, and, the distribution channels and the relief channel do not communicate unless a leak forms within a distribution channel, optionally wherein at least one such baffle is associated with the first zone and a separate such baffle is associated with the second zone;

~~m)~~l) the system comprises multiple coalescers, optionally wherein the coalescers are not interconnected through one or more fluidic pathways, are interconnected through one or more fluidic pathways, one or more of the coalescers is associated with at

least one anti-foam device, each coalescer comprises a lower surface in contact with the jacketed tank head;

~~n)~~m) the system comprises a coalescer that comprises a flexible container comprising a tortuous fluid pathway, comprises a flexible, semi-rigid, or rigid tubular form providing for cyclonic removal of gas from the headspace; and/or, comprises a container comprising mesh and/or packed solids;

~~o)~~n) the system comprises an exhaust pump, optionally wherein: tubing connects the exhaust pump downstream of a sterile barrier filter in fluidic communication with the disposable reaction container; tubing connects the exhaust pump to the coalescer and an inlet or an outlet of a sterile barrier in fluidic communication with the disposable reaction container; the exhaust pump comprises variable speed control and being optionally operably linked to instrumentation for maintaining DC pressure; a first fan, optionally located on the condenser, draws exhaust gas from the headspace through the coalescing device and into or through a downstream sterile barrier; and/or, at least a second fan recirculating exhaust gas within the condenser headspace and / or coalescing device;

~~p)~~o) the system comprises a jacketed tank head that physically supports a disposable reaction container;

~~q)~~p) the system comprises a heat transfer system at least partially directly in direct contact with the exterior of the second zone and at least partially not positioned within the reaction vessel; and/or,

~~r)~~q) the reaction container comprises a first zone comprising a reaction mixture maintained at a first temperature; a second zone comprising a headspace above the reaction mixture into which humid gas migrating from the reaction mixture can migrate; and at least one diaphragm pressure transmitter, load cell, and/or scale in contact with the second zone, optionally comprising a membrane for detecting pressure in contact with the reaction container, detects the pressure exerted upon the reaction container by gases and fluids present in the second zone, and/or contacts the exterior surface of the reaction container is in communication with a control system for adjusting the pressure within the second zone in response to information received from diaphragm pressure transmitter, optionally wherein the control system continuously monitors information generated by the system, adjusts the pressure within the second zone using an exhaust pump, and/or is automated.

~~6. The system of any preceding claim wherein the reaction container is a disposable reaction container.~~

~~7.~~6. The system of any preceding claim, comprising:

~~a) at least one exhaust line leading from a disposable reaction container (DC) through which exhaust gas exiting the DC traverses;~~

~~b) an exhaust filter through which the exhaust gas traverses to exit the system;~~

~~c) at least one source of external heated air;~~

~~d) at least one fluidic pathway connecting the at least one source of external heated air to the at least one exhaust line; and,~~

~~optionally comprising~~ a sterile filter between the at least one source of external heated air to the at least one exhaust line, and at least one second fluidic pathway connecting heated air that exits the sterile filter and the at least one exhaust line.

~~8.~~7. The system of any preceding claim wherein the ~~external~~ heated air comprises a temperature sufficiently above that of the exhaust gas such that upon mixture of the external heated air and the exhaust gas to produce a mixed exhaust gas, the relative humidity of the mixed exhaust gas is less than that of the exhaust gas.

~~9.~~8. The system of claim 7~~8~~ wherein the relative humidity of the mixed exhaust gas is sufficiently low such that moisture from the mixed exhaust gas does not accumulate on the filter as the mixed exhaust gas exits the system.

~~10.~~9. A method for decreasing the relative humidity of an exhaust gas within a reaction system comprising traversing the exhaust gas through a system of any preceding claim.

10~~1~~. A method for carrying out a reaction using a system of any preceding claim.