## CLAIMS

1. An instrument for processing a sample, comprising

a first support member and a second support member;

an opening for receiving a flexible reaction container between the first support member and the second support member, the container comprising:

a loading attachment,

a plurality of reaction zones, and

a plurality of sealable flow paths, each having a first side connecting the loading attachment to one or more fill ports, at least one of which is configured for receiving the sample, and a second side connected to at least one of the plurality of reaction zones, the plurality of sealable flow paths providing the only access from the one or more fill ports to the plurality of reagent zones such that when the first side of all of the one or more sealable paths are sealed, the container is fully closed;

a heat sealing system comprising a plurality of heaters provided on at least one of the support members so as to contact the loading attachment and the plurality of sealable flow paths, wherein the plurality of heaters include a number of individually controlled ceramic heater elements associated with each one of the plurality of sealable flow paths, wherein the ceramic heater elements are self-regulating heater elements that include positive thermal coefficient (PTC) heating elements.

2. The instrument of claim 1, wherein the PTC heating elements are self-limiting.

3. The instrument of claim 1, wherein the individually controlled heaters are disposed in at least one of the support members and further comprise the self-regulating heater elements, a housing, an electrical connection to a power source, and a connection to a control unit.

4. The instrument of claim 1, further comprising:

a plunging system including a plurality of pistons positioned and configured in the instrument for moving the sample from the loading attachment into the reaction zones, and

wherein the container is sealed with the heat sealing system prior to actuation of the plunging system.

5. The instrument of claim 4, further comprising a sample preparation system associated with one of the first or second supports, the sample preparation system including components to effect cell lysis and nucleic acid recovery in one or more of the reaction zones of the flexible reaction container.

6. The instrument of claim 5, further comprising an optics system mounted in the instrument and positioned to produce and detect fluorescence in at least one of the reaction zones of the container.

7. The instrument of claim 6, further comprising:

a first heating/cooling device provided on one of the first or second supports, the first heating/cooling device configured for thermal cycling contents of at least one of the reaction zones; and

a second heating/cooling device provided on one of the first or second supports, the second heating/cooling device configured for thermal cycling contents of another one of the reaction zones.

8. The instrument of claim 7, further comprising a computer for controlling one or more of the heat sealing system, the plunging system, the sample preparation system, the optics system, the first heating/cooling device, or the second heating/cooling device.

9. A method for sealing one or more sealable flow paths of a flexible reaction container using the instrument and heat sealing system recited in any one of claims 1-8.

10. A method for sealing a flexible reaction container, comprising:

providing a flexible reaction container having a loading attachment and a plurality of sealable flow paths, each sealable flow path having a first side connecting the loading attachment to one or more fill ports;

disposing the flexible reaction container between a first support member and a second support member of an instrument, a heat sealing system provided on at least one of the support members;

contacting the loading attachment and the plurality of sealable flow paths with the heat sealing system; and

activating the heat sealing system to seal the one or more sealable flow path, wherein the heat sealing system includes one or more individually controlled heaters associated with each of one of the first side of the plurality of sealable flow paths and configured to keep a substantially constant temperature without overheating, wherein the individually controlled heaters include ceramic positive thermal coefficient (PTC) heating elements.

11. The method of claim 10, wherein the heater element keeps the substantially constant temperature without using any regulating electronics.

12. The method of claim 10, wherein the individually controlled heaters are self-regulating and self-limiting.

13. The method of claim 10, wherein each heater comprises a heating element that is flexibly mounted within the heat sealing system.

14. The method of claim 10, wherein each heater further comprises a spring element configured to force the heating element to contact the plurality of sealable flow paths.

15. The method of claim 14, wherein the force exerted by the spring element controls the amount of pressure applied by the heating element to the plurality of sealable flow paths.

16. The method of claim 14, wherein the force exerted by the spring element controls how far the heating element penetrates the side of the plurality of sealable flow paths.