THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1) Apparatus for controlling the temperature of a reaction mixture held within a reaction container, the apparatus including:

a) a radiation source for exposing the reaction container to radiation thereby heating the reaction mixture, wherein the radiation source is one of a laser and an LED;

b) a temperature sensor for sensing a temperature indicative of a reaction mixture temperature; and

c) a controller for controlling the radiation source in accordance with the reaction mixture temperature to thereby selectively heat the reaction mixture.

2) Apparatus according to claim 1, wherein the apparatus includes a heat source for heating a chamber containing the reaction container.

3) Apparatus according to claim 2, wherein the controller is for:

a) increasing the temperature of the reaction mixture at least in part using the radiation source; and,

b) maintaining the temperature of the reaction mixture at least in part using the heat source.

4) Apparatus according to any one of the claims 1 to 3, wherein the apparatus includes a cooling mechanism for cooling the reaction mixture.

5) Apparatus according to any one of the claims 1 to 4, wherein the temperature sensor:

comprises an infra-red sensor and an optical sensor for sensing a colour of a temperature dependent indicator in the reaction mixture;

senses the temperature of the reaction mixture;

senses a reaction container temperature and wherein the controller is for determining the reaction mixture temperature using the reaction container temperature; and/or

senses a chamber temperature and wherein the controller is for determining the reaction mixture temperature using the chamber temperature.

6) Apparatus according to any one of the claims 1 to 5, wherein the radiation source:

generates infra-red radiation;

generates optical radiation;

exposes a heating zone to radiation and wherein the controller controls heating of the reaction mixture by selectively exposing the reaction container to the heating zone; and/or

is adapted to selectively generate a predetermined heating zone and wherein the apparatus includes a coolant supply port adapted to selectively generate a predetermined cooling zone, wherein the predetermined heating zone and the predetermined cooling zone are generated adjacent the heater and the coolant supply port respectively, such that the temperature of the reaction mixture is controllable by selective exposure of the reaction container to the heating zone and/or the cooling zone.

7) Apparatus according to any one of the claims 1 to 6, wherein the apparatus includes a mounting for receiving a number of reaction containers, the radiation source and mounting being arranged to allow heating of one or more of the number of reaction containers.

8) Apparatus according to claim 7, wherein the apparatus includes a drive for moving the mounting relative to the radiation source, and wherein the controller is for controlling the drive to thereby selectively heat reaction mixture in respective ones of the number of reaction containers.

9) Apparatus according to any one of the claims 1 to 8, wherein the controller is for:

a) determining the reaction mixture temperature using signals received from the temperature sensor; and,

b) controlling the radiation source based on the reaction mixture temperature, allowing the reaction mixture temperature to be controlled.

10) Apparatus according to any one of the claims 1 to 9, wherein the controller is for:

a) controlling the radiation source to increase the reaction mixture temperature to the first temperature value;

b) controlling a heat source to maintain the reaction mixture temperature at the first temperature value;

c) controlling a cooling mechanism to thereby decrease and maintain the reaction mixture temperature at the second temperature; and,

d) controlling the radiation source to thereby increase the reaction mixture temperature to the third temperature value; and,

e) controlling the heat source to maintain the reaction mixture temperature at the third temperature value.

11) A method of controlling the temperature of a reaction mixture held within a reaction container, the method including, in a controller,

a) determining a reaction mixture temperature using signals received from a temperature sensor; and,

b) controlling a radiation source for exposing the reaction container to radiation thereby heating the reaction mixture, the radiation source being controlled based on the reaction mixture temperature, allowing the reaction mixture temperature to be controlled;

wherein the radiation source is one of a laser and an LED.

12) Apparatus for controlling the temperature of a reaction mixture held within a reaction container, the apparatus comprising:

a heater adapted to selectively generate a predetermined heating zone and a coolant supply port adapted to selectively generate a predetermined cooling zone, wherein the predetermined heating zone and the predetermined cooling zone are generated adjacent the heater and the coolant supply port respectively, such that the temperature of the reaction mixture is controllable by selective exposure of the reaction container to the heating zone and/or the cooling zone;

wherein the heater is a radiation source comprising one of a laser and an LED.

13) Apparatus according to claim 12, wherein the temperature of the reaction mixture is controllable by selective exposure of the reaction container to the heating zone or the cooling zone according to a predetermined thermal profile.

14) Apparatus according to any one of the claims 12 to 13, wherein

the heating zone and cooling zone are coincident; and

the reaction container is at least partially transmissive to the radiation.

15) A method for controlling the temperature of a reaction mixture held within a reaction container, the method comprising the steps of:

i) providing a heater adapted to selectively generate a predetermined heating zone; and

ii) providing a coolant supply port adapted to selectively generate a predetermined cooling zone;

iii) wherein the predetermined heating zone and the predetermined cooling zone are generated adjacent the heater and the coolant supply port respectively; and

iv) controlling the temperature of the reaction mixture by selective exposure of the reaction container to the heating zone and/or the cooling zone;

wherein the heater is a radiation source comprising one of a laser and an LED.

16) A method for controlling the temperature of a reaction mixture held within a reaction container, the method comprising the step of selectively exposing the reaction container to a predetermined heating zone and/or a predetermined cooling zone, wherein the predetermined heating zone and the predetermined cooling zone are generated adjacent a heater and a coolant supply port respectively;

wherein the heater is a radiation source comprising one of a laser and an LED.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

10) Apparatus according to any one of the claims 1 to 9, wherein the controller is for:

a) controlling the radiation source to increase the reaction mixture temperature to the first temperature value;

b) controlling a heat source to maintain the reaction mixture temperature at the first temperature value;

c) controlling a cooling mechanism to thereby decrease and maintain the reaction mixture temperature at the second temperature; and,

d) controlling the radiation source to thereby increase the reaction mixture temperature to the third temperature value; and,

e) controlling the heat source to maintain the reaction mixture temperature at the third temperature value.