Claims

1. System comprising a t~~T~~emperature control device and at least one bag (17(i)) containing reaction mixes,

the temperature control device being arranged to ~~for~~ control~~ling~~ a temperature of ~~a substance~~said at least one bag to obtain a first temperature (T1) and to change to a second temperature (T2), the ~~system~~ temperature control device comprising at least a first heating block (27(1); 34(1)) and a second heating block (29(1); 34(1)), as well as a heating device (47), the heating device (47) being arranged to heat said first heating block (27(1); 34(1)) to said first temperature (T1) and to heat said second heating block (29(1); 34(1)) to said second temperature (T2), the temperature control device having a first ~~material~~ object comprising either a first further heating block (27(2)); or a first isolator (43(1)) arranged opposite~~ng~~ to said first heating block ((27(1)) such as to define a first space between them arranged to receive said ~~substance~~ at least one bag and define a first temperature zone (27(3)) having ~~substantially~~ the first temperature (T1) and the temperature control device having a second ~~material~~object comprising either a second further heating block (29(2)); or a second isolator (45(1)) arranged opposite~~ng~~ to said second heating block ((29(1)) such as to define a second space between them arranged to receive said at least one bag ~~substance~~ and defining a second temperature zone (29(3)) having ~~substantially~~ the second temperature (T2), the first and second spaces being arranged such that the at least one bag ~~substance~~ can be moved from the first temperature zone ((27(3)) to the second temperature zone ((29(3)),

said at least one bag (17(i)) having a wall thickness of 0.01 mm or thinner and a volume in the range of 5 to 100 µl, and

the heating blocks (27(1), 29(1); 27(2)/29(2)) having a heat capacity which is at least 10 times higher than the heat capacity of said at least one bag (17(i)) containing reaction mixes.

2. The system ~~emperature control device~~ according to claim 1, wherein the temperature control device comprises at least a first set of heating blocks (27(1)/27(2)) and a second set of heating blocks (29(1)/29(2)), the heating device (47) being arranged to heat said first set of heating blocks (27(1)/27(2)) to said first temperature (T1) and to heat said second set of heating blocks (29(1)/29(2)) to said second temperature (T2), the first set of heating blocks ((27(1)/27(2)) being separated from the second set of heating blocks ((29(1)/29(2)) by a temperature isolating material ((43(1)/43(2)), ~~the first set of heating blocks ((27(1)/27(2)) defining said first space between them and the second set of heating blocks ((27(1)/27(2)) defining said second space between them~~.

3. The system ~~emperature control device~~ according to claim 2, wherein the temperature isolating material ((43(1)/43(2)) is made of polyoxymethylene (POM).

4. The system ~~emperature control device~~ according to claim 1, 2 or 3, wherein the heating blocks ((27(1)/27(2), 29(1)/29(2)) are made of one of a metal~~, for instance aluminium, and~~ a bag filled with a liquid~~, such as water~~, ~~or~~ and a bag filled with gas.

5. The system ~~emperature control device~~ according to claim 2, 3 or 4, wherein the temperature control device comprises a driving device~~, like a motor~~ (39)~~,~~ arranged to move said first heating block (27(1) and said first ~~material~~ object relative to one another, and to move said second heating block (29(1)) and said second ~~material~~ object relative to one another such as to press against the ~~substance~~at least one bag (17(i)).

6. The system ~~emperature control device~~ according to claim 5, wherein the driving device (39) is arranged to press against said ~~substance~~at least one bag (17(i)) with a force in a range between 1-10 N~~, preferably between 3-8 N, more preferably between 4-6 N, such as 5 N~~.

7. System according to claim 6, wherein said force is between 3-8 N.

8. System according to claim 6, wherein said force is between 4-6 N.

~~7~~9. The system ~~emperature control device~~ according to any of the preceding claims, comprising a scanner, the scanner comprising a light source (32) for producing light with a first wave length (λ1), a first lens (30(1)) for directing said light to said ~~substance~~at least one bag, a detector (34) for receiving light emitted from said ~~substance~~at least one bag at a second wavelength (λ2), and a processor (36) connected to said detector (34) to receive an output signal from said detector (34) and to analyse said reaction mixes within said ~~substance~~at least one bag based on said received output signal.

~~8~~10. The system ~~emperature control device~~ according to claim ~~7~~9, wherein ~~a first one of~~ said second ~~set of~~ heating block~~s~~ (29(1) comprises ~~a first subset of~~two separate heating blocks (29(1,1)/29(1,2)), said first lens (30(1)) being arranged between ~~individual ones of at least one of said first subset of~~ said two separate heating blocks (29(1,1)/29(1,2)).

~~9~~11. The system ~~emperature control device~~ according to claim ~~8~~10, wherein ~~a second one of~~ said second further ~~set of~~ heating block~~s~~ (29(2)) comprises ~~a second subset of~~ two further separate heating blocks (29(2,1)/29(2,2)), said scanner comprising a second lens (30(2)) arranged between ~~individual ones of said second subset of~~ said two further separate heating blocks (29(2,1)/29(2,2)) in order to receive said light emitted from said ~~substance~~at least one bag at said second wavelength (λ2) and transmit it to said detector (34).

~~10~~12. The system ~~emperature control device~~ according to any of the preceding claims, wherein at least the first heating block (27(1)) comprises a first slot (28(1) in a first surface and the first further heating block (27(2)) comprises a second slot~~s~~ (~~28(1);~~ 28(2)) in a second surface~~s~~ opposing ~~one another~~said first surface.

~~11~~13. The system ~~emperature control device~~ according to any of the preceding claims, wherein all sets of heating blocks are arranged on a circle such that all said temperature zones are located on said circle.

~~12~~14. The system ~~emperature control device~~ according to claim 1, wherein the first heating block (27(1)) and the second heating block (29(1)) are integral parts of a third heating block

(34(1) having first and second end portions, said first heating block being formed by said first end portions and said second heating block being formed by a portion between said first and second end portions of a single heating block (34(1)).

~~13~~15. The Ssystem ~~comprising a temperature control device~~ according to any of the preceding claims ~~1-12 as well as a substance to be heated to said first temperature (T1) and to change to said second temperature (T2), said substance comprising a bag (17(i)) containing~~, wherein said reaction mixes comprise~~, preferably~~ PCR-reaction mixes~~, most preferably a liquid PCR-reaction mix~~.

~~14~~16. The Ssystem according to claim ~~13~~15, wherein said heating device (47) is arranged to control said first heating block (27(1)) to be on said first temperature and said second heating block

(29(1)) to be on said second temperature such as to allow a PCR process to be performed within said bag (17(i)).

~~15~~17. The ~~S~~system according to claim ~~14~~16, wherein the temperature control device comprises a third set of heating blocks (31(1)/31(2)), the heating device (47) being arranged to heat said third set of heating blocks (31(1)/31(2)) to a third temperature (T3), said first temperature (T1) being in a range of 367 - 369 K, the second temperature (T2) being in a range of 321 – 343 K, more preferably 331 – 335 K, and the third temperature (T3) being in a range of 345 – 347 K.

~~16~~18. The ~~S~~system according to any of the preceding claims ~~13-15~~, wherein the bag (17(i)) is made of one of polypropylene, polyethylene, polyethene, PMMA, polycarbonate or other suitable transparent materials.

~~17~~19. The ~~S~~system according to any of the preceding claims ~~16~~, wherein said bag (17(i)) has a volume of ~~between 5 and 100 µl, more preferably~~ between 10 and 50 µl~~, most preferably 20 µl~~.

~~18~~20. The ~~S~~system according to any of the preceding claims ~~13-17~~, wherein each individual one of the heating blocks has a heat capacity between 80 and 1000 J/K.

~~19~~21. Method of using a system ~~temperature control device~~ according to any of the claims 1-~~12~~20~~, or a system according to any of the claims 13-18~~, characterized by:

- Providing ~~a~~ said at least one bag (17(i))~~substance~~ with a primer and an amount of double-stranded DNA,
- Moving said at least one bag (17(i))~~substance~~ into said first temperature zone such as to perform a denaturing action on said DNA and render said at least one bag (17(i)) with denatured DNA,
- Moving said at least one bag (17(i)) with denaturated DNA to said second temperature zone such as to perform an annealing action with said primer and render said at least one bag with (17(i)) with an annealed substance,
- Moving said at least one bag with (17(i)) with said annealed substance to said third temperature zone such as to perform an extension action.

22. Method according to claim 21, wherein said annealing and extension actions ~~possibly being~~ are performed in one single action in one single temperature zone.

~~20. Method of performing a nucleic acid amplification process such as a PCR process on double-stranded DNA, characterized by shaking said DNA during the process.~~