[CLAIMS]

1. A reaction processor comprising:

a reaction processing vessel in which a channel where a sample moves is formed;

a liquid feeding system that moves and stops the sample in the channel;

a temperature control system that provides a first temperature region maintained at a first temperature and a second temperature region maintained at a second temperature lower than the first temperature in the channel;

a detection system that detects the sample passing through a detection region that is set between the first temperature region and the second temperature region of the channel; and

a control unit that controls the liquid feeding system based on a signal detected by the detection system,

wherein when the sample moves from the second temperature region to the first temperature region, the control unit instructs the liquid feeding system to stop the sample when a predetermined first waiting time has passed from the time when the passage of the sample through the detection region is detected by the detection system,

wherein when the sample moves from the first temperature region to the second temperature region, the control unit instructs the liquid feeding system to stop the sample when a predetermined second waiting time, which is set independently

of the first waiting time, has passed from the time when the passage of the sample through the detection region is detected by the detection system, and

wherein given that:

when the sample moves from the second temperature region to the first temperature region, the moving speed of the sample in the detection region is denoted as a first moving speed v_1, and the distance between an end portion of the sample stopping at a predetermined position in the channel that is closest to the detection region and the center of the detection region is denoted as X_{01};

when the sample moves from the first temperature region to the second temperature region, the moving speed of the sample in the detection region is denoted as a second moving speed v_2, and the distance between an end portion of the sample stopping at a predetermined position in the channel that is closest to the detection region and the center of the detection region is denoted as X_{02}; and

when a fixed period of time specific to the reaction processor is denoted as t_c,

a first waiting time $t_{d2/1}$ is defined by the following equation:

$t_{d2/1} = X_{01}/v_1 - t_c$, and

a second waiting time $t_{d2/2}$ is defined by the following equation:

$t_{d2/2} = X_{02}/v_2 - t_c$.

2. A reaction processor comprising:

a reaction processing vessel in which a channel where a sample moves is formed;

a liquid feeding system that moves and stops the sample in the channel;

a temperature control system that provides a first temperature region maintained at a first temperature and a second temperature region maintained at a second temperature lower than the first temperature in the channel;

a detection system that detects the sample passing through a detection region that is set between the first temperature region and the second temperature region of the channel; and

a control unit that controls the liquid feeding system based on a signal detected by the detection system,

wherein when the sample moves from the second temperature region to the first temperature region, the control unit instructs the liquid feeding system to stop the sample when a predetermined first waiting time has passed from the time when the passage of the sample through the detection region is detected by the detection system,

wherein when the sample moves from the first temperature region to the second temperature region, the control unit instructs the liquid feeding system to stop the sample when a predetermined second waiting time, which is set independently of the first waiting time, has passed from the time when the

passage of the sample through the detection region is detected by the detection system, and

wherein given that:

when the sample moves from the second temperature region to the first temperature region, the moving speed of the sample in the detection region is denoted as a first moving speed v_1, and the distance between an end portion of the sample stopping at a predetermined position in the channel that is closest to the detection region and the center of the detection region is denoted as X_{01};

when the sample moves from the first temperature region to the second temperature region, the moving speed of the sample in the detection region is denoted as a second moving speed v_2, and the distance between an end portion of the sample stopping at a predetermined position in the channel that is closest to the detection region and the center of the detection region is denoted as X_{02};

when a fixed period of time specific to the reaction processor is denoted as t_c, and α and β are defined as correction coefficients,

a first waiting time $t_{d2/1}$ is defined by the following equation:

$t_{d2/1} = \alpha * (X_{01}/v_1) - t_c$, and

a second waiting time $t_{d2/2}$ is defined by the following equation:

$t_{d2/2} = \beta * (X_{02}/v_2) - t_c$.

3. The reaction processor according to claim 2, wherein $\alpha < 1$ and/or $1 < \beta$ are satisfied.

4. The reaction processor according to any one of claims 1 through 3, wherein t_c is time corresponding to the difference between the time when the sample has actually passed through the detection region and the time when the detection system has detected the passage of the sample through the detection region.

5. The reaction processor according to any one of claims 1 through 4,

wherein the sample includes DNA, a PCR reagent, and a reagent that emits fluorescence,

wherein the detection system includes a fluorescence detector for detecting fluorescence emitted from the sample, and

wherein given that:

the time the sample takes to pass through the detection region when the sample moves from the second temperature region to the first temperature region is denoted as a first transit time t_{p1}; and

the time the sample takes to pass through the detection region when the sample moves from the first temperature region to the second temperature region is denoted as a

second transit time t_{p2},

the control unit obtains the first transit time t_{p1} and the second transit time t_{p2} based on the signal from the fluorescence detector or a value obtained by performing predetermined arithmetic processing on the signal and on a predetermined threshold value, and

the control unit calculates the first moving speed $v_1 = L/t_{p1}$ based on the first transit time t_{p1} and the length L of the sample and the second moving speed $v_2 = L/t_{p2}$ based on the second transit time t_{p2} and the length L of the sample.

6. The reaction processor according to claim 5, wherein the control unit changes the threshold value according to the progress of the reaction of the sample.

7. The reaction processor according to claim 5 or 6, wherein the control unit controls the liquid feeding system such that the first transit time t_{p1} and the second transit time t_{p2} become predetermined target transit times.

8. A method for controlling a reaction processor comprising:

a reaction processing vessel in which a channel where a sample moves is formed;

a liquid feeding system that moves and stops the sample in the channel;

a temperature control system that provides a first temperature region maintained at a first temperature and a second temperature region maintained at a second temperature lower than the first temperature in the channel; and

a detection system that detects the sample passing through a detection region that is set between the first temperature region and the second temperature region of the channel,

the method comprising:

instructing, when the sample moves from the second temperature region to the first temperature region, the liquid feeding system to stop the sample when a predetermined first waiting time has passed from the time when the passage of the sample through the detection region is detected by the detection system, and

instructing, when the sample moves from the first temperature region to the second temperature region, the liquid feeding system to stop the sample when a predetermined second waiting time, which is set independently of the first waiting time, has passed from the time when the passage of the sample through the detection region is detected by the detection system wherein given that:

when the sample moves from the second temperature region to the first temperature region, the moving speed of the sample in the detection region is denoted as a first moving speed v_1, and the distance between an end portion of the

sample stopping at a predetermined position in the channel that is closest to the detection region and the center of the detection region is denoted as X_{01};

when the sample moves from the first temperature region to the second temperature region, the moving speed of the sample in the detection region is denoted as a second moving speed v_2, and the distance between an end portion of the sample stopping at a predetermined position in the channel that is closest to the detection region and the center of the detection region is denoted as X_{02}; and

when a fixed period of time specific to the reaction processor is denoted as t_c,

a first waiting time $t_{d2/1}$ is defined by the following equation:

$t_{d2/1} = X_{01}/v_1 - t_c$, and

a second waiting time $t_{d2/2}$ is defined by the following equation:

$t_{d2/2} = X_{02}/v_2 - t_c$.

9. A method for controlling a reaction processor comprising:

a reaction processing vessel in which a channel where a sample moves is formed;

a liquid feeding system that moves and stops the sample in the channel;

a temperature control system that provides a first

temperature region maintained at a first temperature and a second temperature region maintained at a second temperature lower than the first temperature in the channel; and

a detection system that detects the sample passing through a detection region that is set between the first temperature region and the second temperature region of the channel,

the method comprising:

instructing, when the sample moves from the second temperature region to the first temperature region, the liquid feeding system to stop the sample when a predetermined first waiting time has passed from the time when the passage of the sample through the detection region is detected by the detection system, and

instructing, when the sample moves from the first temperature region to the second temperature region, the liquid feeding system to stop the sample when a predetermined second waiting time, which is set independently of the first waiting time, has passed from the time when the passage of the sample through the detection region is detected by the detection system,

wherein given that:

when the sample moves from the second temperature region to the first temperature region, the moving speed of the sample in the detection region is denoted as a first moving speed v_1, and the distance between an end portion of the

sample stopping at a predetermined position in the channel that is closest to the detection region and the center of the detection region is denoted as X_{01};

when the sample moves from the first temperature region to the second temperature region, the moving speed of the sample in the detection region is denoted as a second moving speed v_2, and the distance between an end portion of the sample stopping at a predetermined position in the channel that is closest to the detection region and the center of the detection region is denoted as X_{02};

when a fixed period of time specific to the reaction processor is denoted as t_c, and α and β are defined as correction coefficients,

a first waiting time $t_{d2/1}$ is defined by the following equation:

$$t_{d2/1} = \alpha * (X_{01}/v_1) - t_c, \text{ and}$$

a second waiting time $t_{d2/2}$ is defined by the following equation:

$$t_{d2/2} = \beta * (X_{02}/v_2) - t_c.$$