

WHAT IS CLAIMED IS:

1. A flow control and processing cartridge used in a nucleic acid analysis apparatus, comprising:

a cartridge body comprising plural chambers for storing at least one sample and plural biochemical reagents and buffers, and plural channels connected with the plural chambers; and

a reaction chip in conjunction with the cartridge body and comprising plural detection wells, at least one main fluid channel connected with the detection wells and adapted to dispense the sample into the detection wells, and at least one gas releasing channel connected with the detection wells and adapted to release gas from the detection wells, wherein the main fluid channel comprises plural wide channel parts, plural narrow channel parts, and plural well inlet channels, each of the plural wide channel parts is aligned with one of the plural detection wells and connected with the corresponding detection well through the corresponding well inlet channel, each of the plural narrow channel parts is connected between two adjacent wide channel parts, and the gas releasing channel is narrower than all channels of the main fluid channel.

2. The flow control and processing cartridge according to claim 1, wherein a flow resistance at the narrow channel part is higher than a combined flow resistance at the wide channel part and at the well inlet channel.

3. The flow control and processing cartridge according to claim 2, wherein the flow resistance at the narrow channel part is 2 to 20 times higher than the combined flow resistance at the wide channel part and at the well inlet channel.

4. The flow control and processing cartridge according to claim 1, wherein the flow resistance at the gas releasing channel is 2 to 500 times higher than the flow resistance at the narrow channel part.

5. The flow control and processing cartridge according to claim 1, wherein the well inlet channel has a smaller cross-section than the wide channel part.

6. The flow control and processing cartridge according to claim 1, wherein the reaction chip is disposed on one side of the cartridge body.
7. The flow control and processing cartridge according to claim 1, wherein each of the plural detection wells has at least one planar surface.
8. The flow control and processing cartridge according to claim 1, wherein the shape of the reaction chip is substantially a regular polygon.
9. The flow control and processing cartridge according to claim 1, wherein the reaction chip further comprises at least one sample loading hole for adding the sample into the cartridge.
10. The flow control and processing cartridge according to claim 1, wherein the reaction chip further comprises plural sample loading holes for adding different samples into the cartridge.
11. The flow control and processing cartridge according to claim 1, wherein the cartridge is mounted in a chamber of the nucleic acid analysis apparatus, and the reaction chip further comprises at least one alignment slot capable of being aligned with at least one positioning component on the chamber, wherein the positioning component includes a positioning pin.
12. The flow control and processing cartridge according to claim 1, wherein the reaction chip comprises at least one sample inlet, and the cartridge body comprises at least one channel connected to the sample inlet for transferring the sample to the reaction chip.
13. The flow control and processing cartridge according to claim 1, wherein the cartridge body further comprises plural openings at a bottom surface thereof, and the openings are communicated with the chambers through the channels.
14. The flow control and processing cartridge according to claim 1, wherein at least one of a bottom and a top of the detection well comprises a light transmissive thin wall or thin film for passing light therethrough.
15. The flow control and processing cartridge according to claim 1, wherein the

detection well has a light transmissive front wall for passing light therethrough.

16. The flow control and processing cartridge according to claim 1, wherein the gas releasing channel is directly connected with the plural detection wells at locations distal from the corresponding well inlet channels.

17. The flow control and processing cartridge according to claim 1, wherein the main fluid channel and the gas releasing channel have a concentric circular arrangement.