CLAIMS

1. A microfluidic device for handling a fluid sample comprising:

at least one microfluidic well configured to receive the fluid sample, at the at least one microfluidic well comprising

a primary inlet fluidly coupled to an inlet microfluidic channel,

the inlet microfluidic channel fluidly coupled to a plurality of parallel microfluidic channels at inlet ends of the parallel microfluidic channels, each microfluidic channel comprising a plurality of microchambers arranged in series that are fluidly coupled, via an outlet end, to an outlet microfluidic channel,

the outlet microfluidic channel fluidly coupled to a primary vent configured to vent gas from the parallel microfluidic channels,

wherein each microchamber comprises a reaction chamber configured to receive the fluid sample and a vent chamber configured to vent gas from the reaction chamber as the fluid sample flows into the reaction chamber,

wherein the reaction chamber is fluidly coupled to a corresponding microfluidic channel via an inlet and the vent chamber is fluidly coupled to said corresponding microfluidic channel via an outlet,

wherein the reaction chamber is configured to flow the fluid sample to the vent chamber after the gas has been vented to outlet.

2. The microfluidic device according to claim 1, wherein the reaction chamber is larger than the vent chamber.

3. The microfluidic device according to claim 1, wherein the vent chamber is configured with a narrow hydrophobic stricture to initially prevent flow of the fluid sample from the reaction chamber while allowing flow of gas from the reaction chamber as the fluid sample flows into the reaction chamber.

4. The microfluidic device according to claim 3, wherein the vent chamber is configured to release flow of the fluid sample from the reaction chamber when the gas has been vented from the reaction chamber.

5. The microfluidic device according to claim 1, wherein the reaction chamber has a diameter D and the vent chamber has a length L extending in a direction along the plurality of microfluidic channels arranged in parallel and a width W extending in a direction perpendicular to the length,

wherein the vent chamber has a diameter-to-width ratio based on the diameter (D) of the reaction chamber compared to the width (W) of the vent chamber of $D/W \geq 2$ and length-to-width ratio based on the length (L) and width (W) of the vent chamber of $L/W \geq 0.7$.

6. The microfluidic device according to claim 5, the vent chamber has a length-to-width ratio of $L/W \geq 0.8$.

7. The microfluidic device according to claim 6, the vent chamber has a length-to-width ratio of $L/W \geq 0.9$.

8. The microfluidic device according to claim 7, the vent chamber has a length-to-width ratio of $L/W \geq 1$.

9. The microfluidic device according to claim 5, wherein the reaction chamber has a diameter $D \leq 600$ μm.

10. The microfluidic device according to claim 9, wherein the reaction chamber has a depth-to-diameter ratio d/D of about 1.5.

11. The microfluidic device according to claim 9, wherein the reaction chamber has a diameter D of at least 60 μm.

12. The microfluidic device according to claim 1, wherein each reaction chamber has a depth d and each microfluidic channel comprising a plurality of microchambers has segments connecting the plurality of microchambers, wherein the segments have a depth d_2, a ratio d/d_2 of the reaction chamber depth to the microfluidic channel segment depth being no more than 2:1.

13. The microfluidic device according to claim 12, wherein the vent chamber has a depth which is at least 50% of the reaction chamber depth.