Electronic Supplementary Material (ESI) for RSC Advances

Integrated *in situ* genetic analyzer for microbiology in extreme environments

Electronic Supplementary Information

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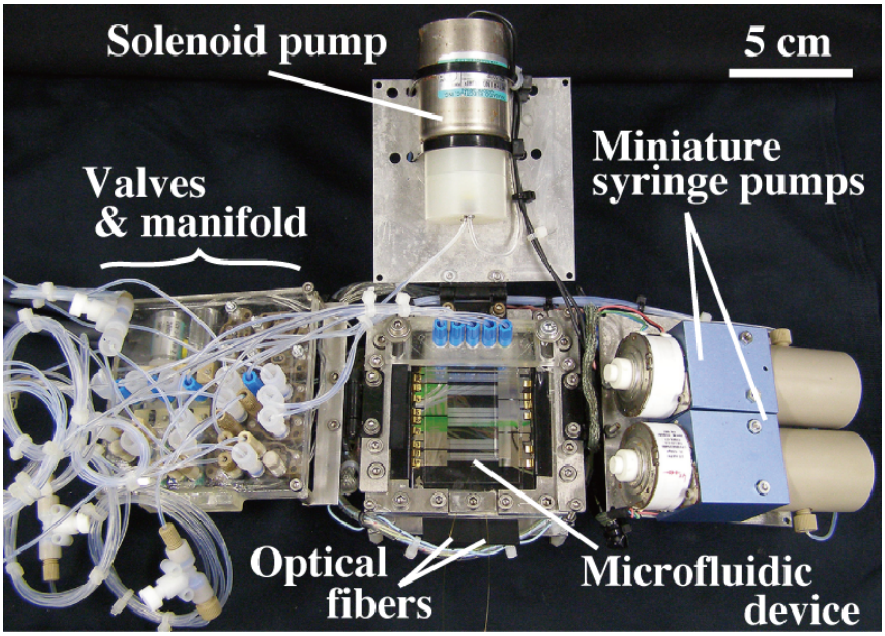
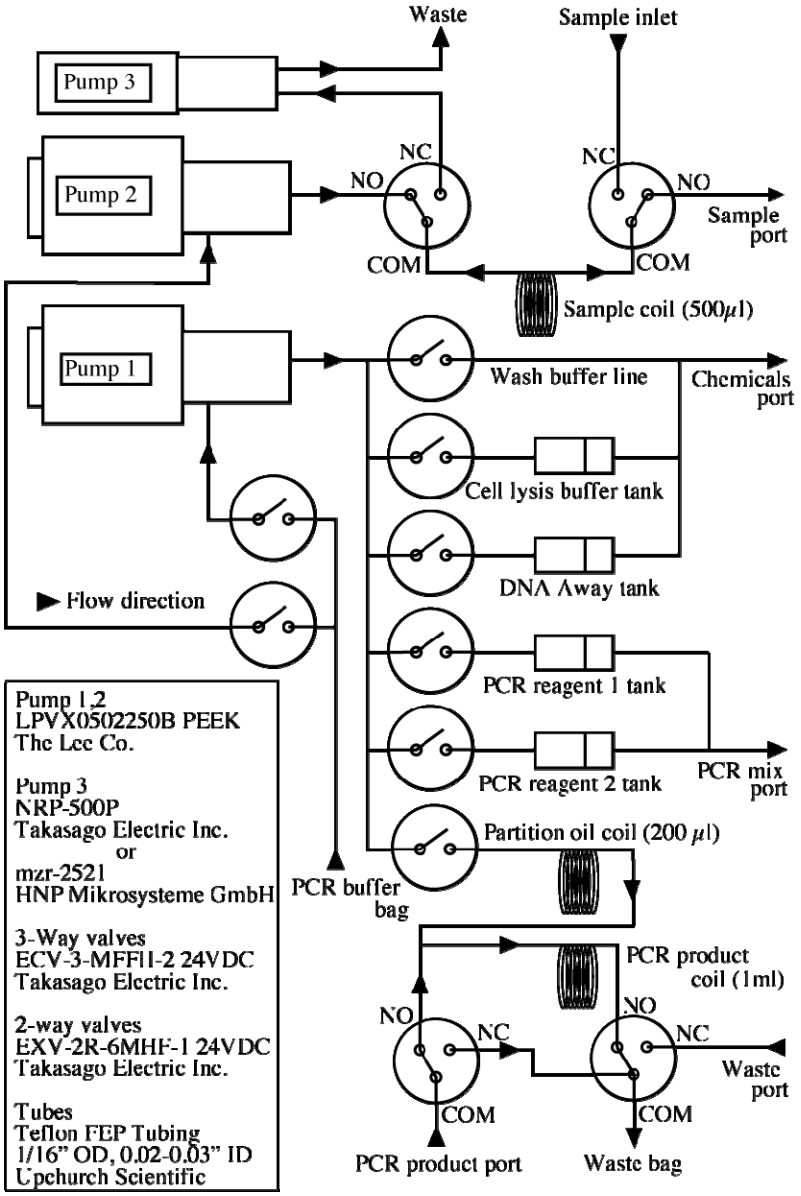
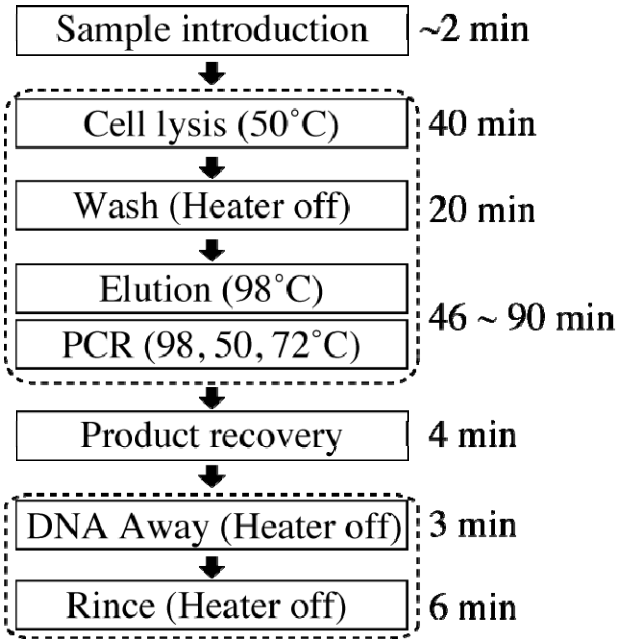


Supplementary Fig. 1 Analysis unit for IISA-Gene. The PDMS-glass hybrid microfluidic device is fixed on a metal housing. The pumping components include 2 miniature syringe pumps for pumping, a solenoid, or DC motor actuated pump for sampling operation, and 12 solenoid actuated valves for reagent switching. The analysis unit in this photo has a solenoid actuated pump for the sample collection. For fluidic connection, Teflon FEP tubes and 1/4-28 UNF threaded connectors were used. The reagent tanks and the waste bag are not shown here.

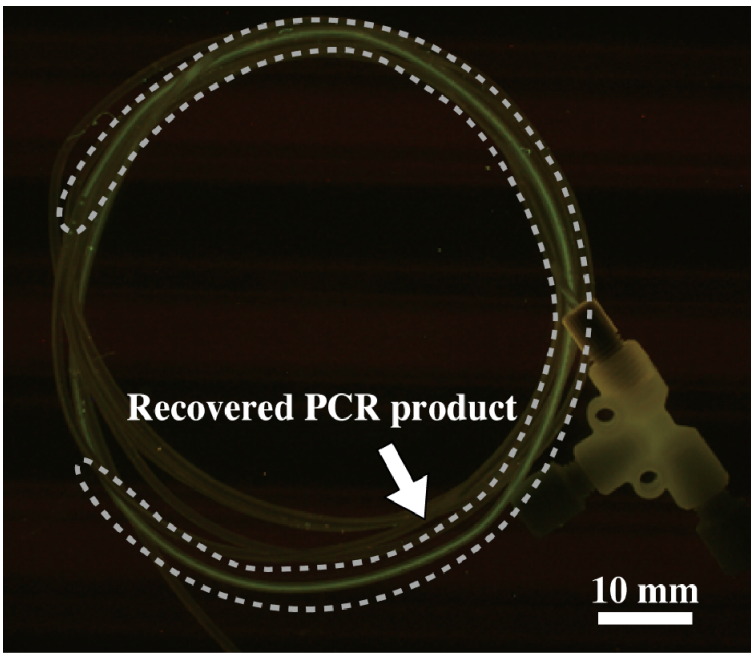


Supplementary Fig. 2 A connection diagram of the pumping components of IISA-Gene. Pumping components containing 2 miniature syringe pumps, a solenoid, or DC motor actuated pump, and 12 solenoid-actuated valves are connected each other using Teflon FEP tubes as shown here. All solenoid-actuated valves are mounted on a

custom-built PMMA manifold.



Supplementary Figure 3 Process diagram of the IISA-Gene system. The processes shown in dotted squares are performed in the microfluidic device.



Supplementary Fig. 4 The recovered PCR product amplified *in situ* during dive #1062 in the Iheya North hydrothermal site. The SYBR Green I stained PCR product recovered in a transparent Teflon FEP tube was visualized under UV illumination using a transilluminator.