

Design and Fabrication of a Micropump With Mixing Function for LOC

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A micropump, which includes a mixing function, has been fabricated. For the application to LOC (Lab On a chip), the micropump utilized PBS (Phosphate Buffered Saline) solution as the working medium. The solution is commonly used in biochemistry and cell culturing. The portable system and low energy consumption are important to realize the LOC device. In spite of a low voltage of 4 V, the flow rate of the micropump was

0.02466 ml/min. The new micropump shows more enhanced performance than existing micropumps. The micropump uses Lorentz force actuation. The Lorentz force acting onto the ionic current in the PBS solution generates the fluid flow in the micropump. For the accurate prediction on flow direction, a computer simulation has been made using commercial CFD code. The results of simulation showing circulation direction were verified by experiment. The fluid circulation from each electrode combined and acted as the mixer in the micropump. The micropump was fabricated 20.2 mm in length, 1 mm in width and 400 μm in electrode length. To measure accurately, a high speed digital camera was used.