

Transport of fluid by magnetically actuated micropump

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Conventional check-valve pumps have problems such as a high pressure drop across the valves, wear and fatigue of the movable parts and difficulty in fabrication.

This work describes simple method to fabricate a valveless diffuser/nozzle-based micropump.

The diffuser/nozzle part and the pump chamber were fabricated using soft lithography and micropump was made of PDMS (poly dimethylsiloxane). The pump chamber consisted of a circular cylindrical volume (diameter: 10mm, thickness: 100 μ m) where the top side had the oscillating diaphragm to which a Nd/Fe/B magnet (diameter: 3mm, thickness: 1.5mm) was fixed.

An external magnetic power source provided attractive/repulsive force to induce supply/pump mode of valveless micropump. The pumping rate was of the order of 10 μ L/min corresponding to the frequency of 1~10Hz.