Studies on characteristic of piezoelectric actuated micropump with check valves

杨宗樺、注
E-mail: 346485@mail.dyu.edu.tw

ABSTRACT

In this paper the design of the micropump has the characteristics of two outlet port and two inlet port, this design makes the liquid flow rate improved largely. Micropump using piezoelectric materials as actuator, stainless steel etched chamber layer, and the flow channel layer with flow channel and valve seats use of acrylic, also cantilever-type PDMS-made check valves, assembly of the above components is a new piezoelectric actuated micropump with check valves, it has the advantages of miniature size, light weight and low power consumption, later for this micropump system performance in depth study. From the experimental results indicate that the performance of the micropump is affected by driving frequency, driving voltage, chamber depth, valve thickness, flow channel size and different blocked pressure. When the drive voltage 160 Vpp, the maximum liquid flow rate 125.6ml/min for the micropump with 2.0mm flow channel, chamber depth of 300μm and 0.5mm valve thickness, the maximum air flow rate 102.2ml/min for the micropump with 1.0mm flow channel, chamber depth of 300μm and 0.5mm valve thickness.

Keywords : Piezoelectric、Actuator、PDMS、Check valve

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