Design and Fabrication of Piezoelectric Valveless Micropump

侍育徵、鄭江河

E-mail: 9608224@mail.dyu.edu.tw

ABSTRACT

The main function of micropump system is to control minute flow rate exactly. In this study, valveless type of piezoelectric micropumps which used diffuse/nozzle structure to replace the conventional cantilever beam type of valve are chosen. The valveless micropump was constructed of one nickel electroforming vibration plate, PDMS or nickel electroforming channel plate, two glass tubes, a PZT actuator and a glass substrate. The optimum dimension of actuating module is obtained for the fabrication by ANSYS numerical simulation. A micropump system in the way could reduce the cost of production, increase the ratio of success and could be mass production. The effects of driving voltage and frequency on the displacement of piezoelectric material and the flow rate of the micropump are investigated. The maximum attainable flowrate is 0.93 ml/min when it is driven by a sin wave of Vpp=80volt, 530Hz. The maximum attainable backpressure is 2.55Kpa.

Keywords : Piezoelectricity, PDMS, Micro Electroforming, ANSYS