An Improved Piezoelectric Valveless Impedance Micropump

黃偉瑞、鄭江河

E-mail: 9806443@mail.dyu.edu.tw

ABSTRACT

This paper presents the fabrication and Improved experimental studies of flow performance on a valveless micro impedance pump. Piezoelectric valveless impedance micropump is the use of piezoelectric actuators in an asymmetric center to impose a fixed frequency of extrusion. A pressure head can be built up to drive flow through the accumulative effects of wave propagation and reflection originating from the periodic PZT excitation, located asymmetrically along the length of the compressible section of the channel. The micro impedance pump was constructed of three nickel electroforming components, two glass tubes, a PZT actuator and a glass substrate. The main different is the width of the flow channel, the flow of different materials on the bottom of whether it will affect the flow and use of finite element analysis software for this whole piezoelectric actuator design modules of all sizes for analysis.

Focus on a variety of experimental conditions, the driving voltage, driving frequency of the micro pump effect of flow rate, find out the maximum flow, experimental results show that voltage pump 200Vpp, the frequency of 18.3kHz sine wave drive, the maximum flow can be per minute up to 0.24 ml.

Keywords : PZT actuator、electroforming、ANSYS、micro impedance pump、valveless

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