Design and Fabrication of Piezoelectric Actuated Microvalve

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ABSTRACT

This paper present the design, experiment, and fabrication of an active microvalve as applied in micropumps. The actuators select the piezoelectricity material, when actuate piezoelectricity actuator to produces the single axial displacement may enable the microvalve to achieve open or close movement. This microvalve structural design has two kind of models, normally close or open. The operating fluid uses the DI Water (De Ion Water), the flow rate of 11.29~22.23 ml/min and the 6~12 kPa hydraulic pressure by the piezoelectricity pump output, when matches the structure which normally the microvalve close, gives the actuator voltage from 0 V to 100 V, the flow rate of 0.02~2.13 ml/min, each minute maximum flow rate error is 1.4~10%; when matches the structure which normally the microvalve open, the flow rate of 0.01~3.19 ml/min, each minute maximum flow rate error is 0.9~10%.

Keywords : Active microvalve、Piezoelectricity actuator、Flow rate、Microfluidic

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