

VALVELSS 압전펌프 진동 해석 및 특성

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Vibration analysis of characteristics and valveless Type Piezoelectric micro-pump

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Abstract : Micropump is very useful component in micro/nano fluidics and bioMEMS applications. Using the flexural vibration mode of PZT bar, a piezopump is successfully made. The PZT bar is polarized with thickness direction. The proposed structure for the piezo-pump consists of an input and an output port, piezoelectric ceramic actuator, actuator support, diaphragm. The traveling flexural wave along the bar is obtained by dividing two standing waves which are temporally and spatially phase shifted by 90 degrees from each other. Fluid is drawn into a forming chamber, eventually the forming chamber closes trapping the fluid therein. The finite elements analysis on the proposed pump model is carried out to verify its operation principle and design by the commercial FEM software. Components of piezopump were made, assembled, and tested to validate the concepts of the proposed pump and confirm the simulation results. The performance of the proposed piezopump the highest pressure level of 83.4kHz.

Key Words ; Piezoelectric pump, Peristaltic traveling wave