

Design and Fabrication of an Array Microejector Driven by a Shear-Mode Piezoelectric Actuator

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Abstract : This paper reports a novel actuating design that uses the shear deformation of a piezoelectric actuator to deflect a bulge-diaphragm for driving an array microdroplet ejector. In essence, we employed a circular-shaped actuator poled radial direction with remnant polarization normal to the actuating electric field for inducing the piezoelectric shear effect. The array microdroplet ejector consists of a shear type piezoelectric actuator, a vibration plate, two chamber plates, two channel plates and a nozzle plate. The vibration, chamber and nozzle plate components are fabricated using nickel electroforming technology, whereas the channel plate is fabricated by etching of stainless steel. The diaphragm displacement was measured by the laser two-dimensional scanning vibrometer. The ejected droplets of the microejector were also observed via an optic visualization system.

Keywords : actuator, nozzle, microejector, piezoelectric

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