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**Fabrication of components for a valve-less micropump or  
microejector by multilevel electroforming technology**

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Abstract

Both the workable micropump and microejector actuated by the shear mode PZT actuators are successfully fabricated. They are based on a similar design and the same process that uses UV-LIGA multi-level electroforming technology. The micropump consists of a vibration plate and a chamber plate while the microejector consists of the same vibration plate and a nozzle plate. The AZ 9260 positive photoresist is used as the electroforming mould. The two alternating steps, the photoresist patterning and nickel electroforming, make components form a quasi 3-D (or 2.5-D) multilevel microstructure. An over-electroforming technique is employed to form the nozzles in nozzle plate for the microejector.

Some useful experimental data about the over-electroforming is proposed to predict and control the orifice diameter. The volume change of the chamber is estimated by both the numerical solution and actual measurement. The liquid ejection of the microejector is observed by a visualization system.