A Study of Piezoelectric Actuator for Nano-Droplet Generator

许富强、郑江河

E-mail: 9419556@mail.dyu.edu.tw

ABSTRACT

With the development of ink-jet printing technology, the inkjet printhead is not only used in the traditional printing requirement, but applied in a lot of emerging fields, such as new organic/polymer lighting emitting display, liquid crystal display, optical communication devices, and MEMS devices etc. In many kinds of inkjet printing technology, the most favor type of inkjet printing technology is the piezoelectric driven printing technology. PZT actuator with the lateral polarization had been fabricated by surface poling technique. Its shear deformation is introduced to actuate a vibration plate in droplet ejecting system. By ANSYS numerical simulation, the optimum dimension of actuating module is obtained for the fabrication. The actuating module is designed to be capable of ejecting a droplet with 1μm diameter. The process for actuator by scraping PZT slurry through a blade has been introduced. The processed actuator was tested, and its displacement and piezoelectric coefficient varying with actuating field were obtained. And, by adjusting the actuating voltage waveform, the preferred output displacement and velocity can be acquired. Using the characteristic of volume displacement magnification in the relatively smaller chamber by the shear mode actuator, the nano-droplet ejection is expected.

Keywords : piezoelectric ; poling ; ink-jet head

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