

Research on the Fluid Dynamic Characteristics of Piezoelectric Micro-jet

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Abstract: A piezoelectric micro-jet is a kind of electronic device which is based on the piezoelectric ink-jet technology and can achieve the drop-on demand requirement. A piezoelectric micro-jet which is designed for bearing lubricating is present in this paper. In order to analyze the fluid dynamic characteristics of the piezoelectric micro-jet so as to obtain well injection performance, a direct coupling simulation method is proposed in this paper. The effects of the pulse excitation parameters on the molding time, molding length, velocity and volume of the droplet are analyzed by the proposed direct coupling method. The pressure distribution inside the cavity of the micro-jet and the statuses of the droplet formation at different time are also given. Finally, the results obtained from direct coupling method are compared with the experimental results, which proves that the method proposed here is effective in predicting and analyzing the fluid dynamic characteristics of piezoelectric micro-jet.

Keywords: Direct coupling; Fluid dynamic; Piezoelectric micro-jet