

## 电渗驱动微泵设计初探

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摘要:

电渗驱动微泵是一种新型的微泵, 具有输出压强高、流量可调范围宽、结构简单、无活动部件等特点, 易与微通道热沉集成, 构成微通道冷却系统, 可用于集路的热管理。本文介绍了电渗驱动微泵的数学模型, 利用PB方程来描述电渗流中电势和离子分布, 讨论了背压与流速的关系, 槽道宽度、工作液体温度、外加压等参数对电渗泵性能的影响。

关键词: 微电子机械系统; 微泵; 电渗流; 双电层

## Initial Study on Electroosmotic Micropump Design

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**Abstract:**

The electroosmotic micropump is a novel pump which has the advantages of high pressure, a wide range of flow rate, simple structure and no moving part. The microchannel cooling system which can be used for integrated circuit thermal management is formed by the electroosmotic micropump and microchannel. Mathematical model which adopted Poisson-Boltzmann equation to predict the distributions of the electric potential and the ions is introduced. Relationship between the back pressure and flow rate discussed, and the effects of pump depth, fluid temperature and supply voltage on the pumping performance are also studied.

**Keywords:** MEMS; micropump; electroosmotic flow; EDL

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