壓電無閥式微幫浦之設計與製作

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摘 要

微幫浦系統主要功能是獲得微小流量的精確控制，本文所製作的微幫浦屬於壓電無閥式微幫浦，是利用擴散口／噴嘴結構來取代傳統懸臂樑式的閥門結構。壓電無閥式微幫浦是由一層電鑄鎳振動板、一層PDMS或電鑄鎳流道層，兩個玻璃管、一壓電致動器與玻璃基材所構成。並利用ANSYS有限元素分析軟體來針對此整體壓電致動器模組各種尺寸設計進行分析。以此方式製作而成的微幫浦系統，不僅可大幅降低成本，提高良率，更可達到快速批次量產的目的。 實驗重點在於探討驅動電壓對壓電薄膜形變之影響與驅動電壓、驅動頻率對微幫浦流率之影響，實驗結果顯示幫浦電壓在160Vpp，頻率365Hz的正弦波驅動下，最大流量可達每分鐘0.93 ml。背壓最高可達2.55 Kpa。

關鍵詞 : 壓電，PDMS，電鑄，ANSYS

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