壓電致動有閥微泵浦之設計與製作及其於電子散熱之應用

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摘 要

近年來，電子產品在性能上不斷進步，使得電子元件的散熱裝置日趨重要，而常見的風冷散熱也漸漸被水冷散熱取代。本論文將利用壓電致動器的特性，設計、製作壓電致動有閥微泵浦並且驗證此微泵浦在電子散熱之效能。 本論文主要是設計、製作及測試新型壓電致動有閥式微泵浦，其具有微小化、質量輕及低消耗功率等優點。微泵浦是由壓電致動器、具有振膜結構之不鏽鋼材料的艙體層、還有流道及閥座結構之壓克力材料的流道層，及兩個由聚二甲基矽氧烷所製作之懸臂樑結構的單向閥所組合而成。此元件設計需要有最大的壓縮比，如此即可當液體泵浦或氣體泵浦使用，並且能夠自我汲取及可容許氣泡在液體中。如要達到此目的，需要有最小的艙體及流道體積並且能產生最大的致動體積變形。並探討驅動電壓、操作頻率對壓電致動有閥微泵浦的流量與位移的影響，找出最大的流量與最高背壓配合散熱鰭片達到最佳的散熱設計。

關鍵詞 : 壓電、致動器、單向閥、散熱

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