微型空氣流量計之研究

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摘 要

本研究之目的在於風速的感測，研究中利用微機電製程技術為基礎，製作出一以氧化鋁材料為基板而白金薄膜為加熱器之熱膜式流量計，以熱線式的方式使白金薄膜在設定的溫度下，以不同的風速吹，導致電阻值變化的特性來製作微型空氣流量計。

此微感測器整體體積相較於一般所使用之感測器為小，且結構簡單，也因為微小尺寸，讓它能有很好的靈敏度與精密量測性。本研究將所選用之氧化鋁板，將氧化鋁基板進行拋光，並將其切割至製程所需之尺寸，接著沉積（deposition）白金薄膜，製作出微型加熱器及感測器之用。最後再將其切割成所需之尺寸。其中設計再以其感測機制分為單晶片及雙晶片。當氣體流經感測端的時候，便會造成感測端之電阻值有所變動，透過儀器量測比較因氣流所造成的不同電阻變化值，進而判斷流體的變化總值來決定風速。在實驗下，給予10 m/s、20 m/s、30 m/s、30 m/s、40 m/s、50 m/s、60 m/s 風速，趨勢皆呈現規律波形變化，可有效達到風速感測的目的。亦在感測範圍內呈現了一個可預期的變化關係。

最後藉由改變不同的電阻、尺寸及間距…等變化，以觀察其感測特性之趨勢，並藉此決定其最佳之感測模式。並於論文附錄進行市售商用流量計感測元件特性與本文做對照比較。

關鍵詞 : 氧化鋁板、沉積、氧化鋁板、靈敏度、加熱器、單晶片、熱線式、微機電系統、空氣流量計

目錄

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