無電電鍍法製備透明導電氧化鋅薄膜之光電特性研究 = Optical and electrical properties of transparent conducting Zinc Oxide.

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摘 要

本實驗是以無電電鍍法，利用氯化亞錫水溶液和氯化鈀水溶 液的活化敏化過程，使的光滑的玻璃表面佈滿著鈀離子，然後利 用硝酸鋅水溶液混合二甲胺硼烷水溶液產生氧化鋅薄膜，使薄膜 成長在佈滿鈀的玻璃基板上。改變硝酸鋅水溶液和二甲胺硼烷的 濃度，以及溶液反應溫度並改變退火溫度及活化敏化時間等等變 數，來研究氧化鋅薄膜的特性。 在薄膜鑑定方面，以X 射線繞射儀、光學顯微鏡、光譜儀， 半導體參數分析儀配合四點探針等方法，分析薄膜的結構、電阻 值、電阻率和光學穿透率。 實驗結果顯示，在去離子水的溶氧度降到約1.1 毫克/升，當 活化敏化時間為各2 分鐘重複3 次，當硝酸鋅與二甲胺硼烷混合 溶液的反應溫度為35?aC，之後通入3%氫氣與氬氣的混合氣，在 550?aC 退火，可得到的氧化鋅薄膜電阻值比退火溫度在500?aC 與 600?aC 的低，而其中又以硝酸鋅水溶液0.075 M 混合二甲胺硼烷 0.01 M 時，可得到電阻值約75 k? A再利用四點探針測量，透過 公式R = ρL/A 可算出薄膜的電阻率約為7.5？ Pcm。

關鍵詞 : 無電電鍍、氧化鋅

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