

以化學水浴法沉積硫化鋅緩衝層特性之研究

林維恩、姚品全

E-mail: 387150@mail.dyu.edu.tw

摘要

本研究以化學水浴沉積法成長ZnS緩衝層薄膜，藉由改變其製程，由傳統的一階段CBD製程為熱力學平衡下反應的過程，因此整個過程相當廢時。在反應溶液內產生均質成核的情況相當嚴重，易影響ZnS與基板結合的平整性，且在反應結束後，易有ZnS顆粒吸附於緩衝層薄膜上方，造成結構鬆散，薄膜易脫落的現象。因此，改為兩階段CBD製程，將玻璃基板浸泡再反應溶液1小時後再將基板放至另一玻璃反應溶液，使基板在一新的環境下進膜反應，希望藉由改變製程的因素，得到更優異的CBD緩衝層薄膜，並探討其薄膜之表面形貌及光學性質，藉此得到理想的緩衝層薄膜。經由研究結果得知，以兩階段CBD製程的緩衝層薄膜，其薄膜批覆性、均勻性經由FE-SEM及AFM觀察，經由UV-vis可以得知其平均穿透度雖然略微下降，但其光學能隙帶由~3.4eV提升至~3.9eV。經由XPS可以得知，硫²⁻有利於氧化鋅的形成，隨硫²⁻濃度的增加Zn2p_{3/2}的ZnS(1021.7V)峰值產生藍移至ZnO(1022.4eV)。

關鍵詞：硫酸鋅、化學水浴沉積法

目錄

目錄摘要.....i	Abstract.....ii	誌謝.....iii	目錄.....iv	圖目錄.....vi	表目錄.....viii	第一章 緒論.....1	1.1 前言.....1	1.2 研究目的與動機.....3	第二章 基本原理與文獻回顧.....4	2.1 太陽電池種類.....5	2.1.1 矽晶太陽能電池.....5	2.1.2 化合物半導體太陽能電池.....6	2.1.3 有機太陽能電池.....7	2.2 太陽電池基本原理.....7	2.3 銅銻鎵砷太陽能電池.....10	2.3.1 鈉玻璃基板(Soda-lime Glass).....11	2.3.2 鋁背電極.....11	2.3.3 銅銻鎵砷吸收層.....12	2.3.4 緩衝層(Buffer Layer).....12	2.3.5 透明導電層(ZnO:Al).....14	2.4 化學水浴沉積法(CBD).....16	2.4.1 成膜機制(Reaction mechanisms).....16	2.4.2 以CBD法沉積ZnS薄膜之反應機制.....19	第三章 實驗步驟與流程.....21	3.1 實驗藥品.....21	3.2 製程設備及儀器.....23	3.3 實驗流程.....24	3.3.1 清洗基板.....24	3.3.2 硫化鋅緩衝層製程.....25	3.4 材料特性分析.....28	3.4.1 冷場發射型掃描式電子顯微鏡(FE-SEM).....29	3.4.2 紫外/可見光光譜分析儀(UV-VIS).....30	3.4.3 X光繞射儀(XRD).....31	3.4.4 原子力顯微鏡(AFM).....32	3.4.5 化學分析電子能譜儀(ESCA).....33	第四章 結果與討論.....34	4.1 CdS緩衝層薄膜.....34	4.2 ZnS一階段CBD製程.....40	4.3 兩階段CBD製程.....46	第五章 結論.....52	參考文獻.....53	圖目錄	圖2-1 太陽能電池效率演進.....6	圖2-2 太陽光譜圖.....8	圖2-3 空氣質量定義圖.....8	圖2-4 太陽電池工作原理.....9	圖2-5 CIGS各層結構.....10	圖2-6 緩衝層不同製備方法之轉換效率.....14	圖2-7 以不同材料為緩衝層之CIGS光電轉換效率.....15	圖2-8 沉膜機制示意圖.....17	圖2-9 化學水浴沉積法反應三個階段示意圖.....18	圖2-10 ZnS CBD成膜反應機構.....20	圖3-1 化學水浴沉積法設備示意圖.....26	圖3-2 實驗流程圖.....27	圖3-4 紫外/可見光光譜分析儀.....30	圖3-5 X光繞射儀.....31	圖3-6 原子力顯微鏡.....32	圖3-7 化學分析電子能譜儀.....33	圖4-1 CdS薄膜之FE-SEM：不同SC(NH ₂) ₂ 濃度之影響.....36	圖4-2 CdS薄膜之AFM：不同SC(NH ₂) ₂ 濃度之影響.....37	圖4-3 CdS薄膜之UV-vis：不同SC(NH ₂) ₂ 濃度之影響.....38	圖4-4 CdS薄膜之能隙：不同SC(NH ₂) ₂ 濃度之影響.....38	圖4-5 CdS薄膜之XRD：不同SC(NH ₂) ₂ 濃度之影響.....39	圖4-6 CdS薄膜之XPS：不同SC(NH ₂) ₂ 濃度之影響.....40	圖4-7 ZnS薄膜之FE-SEM：不同SC(NH ₂) ₂ 濃度之影響.....42	圖4-8 ZnS薄膜之AFM：不同SC(NH ₂) ₂ 濃度之影響.....43	圖4-9 ZnS薄膜之UV-vis：不同SC(NH ₂) ₂ 濃度之影響.....44	圖4-10 ZnS薄膜之能隙：不同SC(NH ₂) ₂ 濃度之影響.....44	圖4-11 ZnS薄膜之XRD：不同SC(NH ₂) ₂ 濃度之影響.....45	圖4-12 ZnS薄膜之XPS：不同SC(NH ₂) ₂ 濃度之影響.....45	圖4-13 ZnS薄膜之FE-SEM：不同SC(NH ₂) ₂ 濃度順序之影響.....48	圖4-14 ZnS薄膜之AFM：不同SC(NH ₂) ₂ 濃度順序之影響.....49	圖4-15 ZnS薄膜之UV-vis：不同SC(NH ₂) ₂ 濃度順序之影響.....50	圖4-16 ZnS薄膜之能隙：不同SC(NH ₂) ₂ 濃度順序之影響.....50	圖4-17 ZnS薄膜之XRD：不同SC(NH ₂) ₂ 濃度順序之影響.....51	圖4-18 ZnS薄膜之XPS：不同SC(NH ₂) ₂ 濃度順序之影響.....51	表目錄	表1 CdS與ZnS緩衝層比較.....2	表2 CdS緩衝層濃度代號.....34	表3 一階段CBD-ZnS製程濃度代號.....40	表4 兩階段CBD-ZnS製程濃度代號.....46
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