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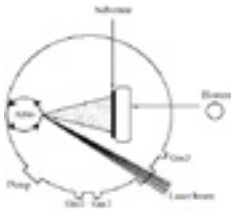
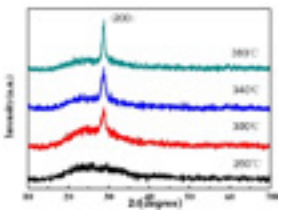
Study on AlSb thin films prepared by pulsed laser deposition

Ping Tang[1,2], **Bing Li**[1] and **Lianghuan Feng**[1]
[1]Sichuan University, China
[2]Chinese Academy of Sciences, China

AlSb is a kind of potential absorber material for thin film solar cells. In this paper, AlSb thin films were prepared by using pulsed laser deposition method, and the effects of substrate temperature on the properties of AlSb thin films were studied. XRD results showed that the average grain size of AlSb films increased with the increase of substrate temperature. AFM images suggested that the surface morphology of crystal AlSb thin films was continuous, homogeneous with high compactness. The electrical measurements showed that the AlSb films were semiconductors with the conductivity activation energy of 0.08, 0.17 and 0.01 eV. At the optimized temperature of 380°c, the optical band gap of AlSb thin film was 1.52 eV. The obvious photovoltaic effect has been observed in TCO/ZnS/AlSb/Au device, which demonstrated that AlSb is a potential absorber for thin film solar cells. In present work, high quality AlSb thin films were prepared by using PLD method and the AlSb thin films we prepared were used in solar cells. The effects of substrate temperature on the properties of AlSb thin films were studied. High substrate temperature is helpful for the grain growth of AlSb films. The crystal growth was enhanced and the average grain size became larger with the increase of substrate temperature. The surface morphology of crystal AlSb thin films is continuous, homogeneous with high compactness. The electrical measurement exhibits that AlSb thin films prepared by PLD method are semiconductors with conductivity activation energy of 0.08, 0.17 and 0.01eV. The optical band gap of AlSb thin film is 1.52 eV at the optimized substrate temperature of 380°c. Over 30 mV open circuit voltage is obtained in the TCO/ZnS/AlSb/Au device.





Biography

Ping Tang has her expertise in preparation and characterization of compound semiconductors and photovoltaic devices. Her research interest focuses on the study of novel compound semiconductors and related solar cells. At present, she is working on the fabrication of AlSb thin films and AlSb/ZnS based solar cells. She has succeeded in preparing AlSb thin film materials and fabricating AlSb based solar cells with architecture of TCO/ZnS/AlSb/Au and an open-circuit voltage of over 30 mV has been achieved.

ybtangping@163.com

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