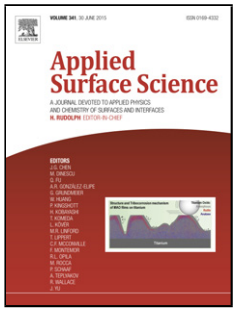

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Synthesis and characterization of boron antimonide films by pulsed laser deposition technique

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Abstract

Boron antimonide films (BSb) were successfully deposited by pulsed laser deposition technique on glass, fused silica and silicon substrates by using a target prepared by admixing boron and antimony powders in appropriate proportions. Nd- YAG laser was used to ablate the target. Films deposited at substrate temperatures of 673 K and above showed zinc blende structure. Grain growth in the films was observed in films deposited at higher temperatures. Films deposited on Si (100) substrates at higher deposition temperatures indicated lower residual strain. SIMS studies indicated very uniform distribution of B and Sb in the whole bulk of the films. XPS spectra indicated characteristic peaks at ~ 34.87 eV for Sb4d, ~188.1 eV for B1s, ~765.5 eV for Sb3p3/2, ~ 539 eV for Sb3d3/2 and ~812.8 eV for Sb3p1/2. Raman peaks for BSb were located at ~ 64 cm^{-1}, 152 cm^{-1}, 595 cm^{-1} and 821 cm^{-1}.

Keywords: Semiconductors; Laser processing; Luminescence; Photoelectron spectroscopy

PACS: 68.55.-a; 78.66.Fd; 81.15.Fg

1. Introduction

Binary compounds like AlSb, BSb and InAs have become important for their use in hot carrier solar cells (HCSC). The phononic band gaps of these materials can be tuned

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