

Phase mixture and anti-reflection window in visible of annealed beryllium-nitride thin films on silicon crystal

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Abstract

Beryllium-nitride (Be_3N_2) thin films were grown on silicon $\text{Si}(1\ 1\ 1)$ substrates by pulsed laser deposition in a RIBER LDM-32 system, and characterized with in/ex situ XPS and SIMS. The structure of the films was analyzed with XRD. The films were further analyzed for surface topographic information with SEM and profilometry, and for optical properties with optical spectroscopy. It was observed that the material, prepared at room temperature and annealed at 700 °C for 2 h, had undergone a partial phase transition to a mixture of amorphous and crystalline phases, and the thin films showed a large anti-reflection window in the visible. Therefore, the annealed Be_3N_2 thin films would be potentially useful for stable electronic packaging with desired photonic features. © 2011 Elsevier GmbH. All rights reserved.

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