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Interdiffusion at Sb/Ge interfaces induced in thin multilayer films by nanosecond laser irradiation

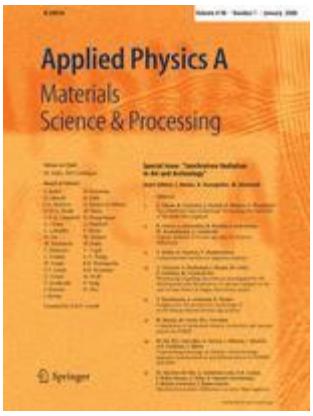
Authors
R. Serna [1]
C. N. Afonso [1]
F. Catalina [1]
N. Teixeira [2]
M. F. da Silva [2]
J. C. Soares [3]

Author Affiliations

- 1. Instituto de Optica, CSIC, Serrano 121, E-28006, Madrid, Spain
- 2. Dept. Fisica, ICEN, LNETI, EN 10, P-2685, Sacavem, Portugal
- 3. Centro de Fisica Nuclear, Univ. Lisboa, P-1699, Lisboa, Portugal

Abstract

Thin films consisting of 3 or 4 Sb and Ge alternating layers are irradiated with single nanosecond laser pulses (12 ns, 193 nm). Real time reflectivity (RTR) measurements are performed during irradiation, and Rutherford backscattering spectrometry (RBS) is used to obtain the concentration depth profiles before and after irradiation. Interdiffusion of the elements takes place at the layer interfaces within the liquid phase. The reflectivity transients allow to determine the laser energy thresholds both to induce and to saturate the process being both thresholds dependent on the multilayer configuration. It is found that the energy threshold to initiate the process is lower when Sb is at the surface while the saturation is reached at lower energy densities in those configurations with thinner layers.



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