

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

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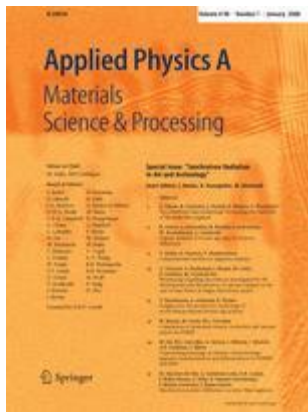
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Abstract

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.



Interdiffusion at Si/SiGe Interfaces Induced by Thin Multilayer Films by Nanosecond Laser Irradiation

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Abstract. The thin covering of Si or SiGe on the substrate layer are irradiated with single nanosecond laser pulses (10 ns, 1000 J/cm²) that can selectively induce interdiffusion and produce atomic intermixing and interfacial interdiffusion (IID) in Si/SiGe heterostructures. The interdiffusion is studied by secondary ion mass spectrometry (SIMS) and other methods. Identification of the atomic intermixing in the heterostructure is made by SIMS. The interdiffusion is studied by SIMS and other methods. It is found that the interdiffusion is induced in the Si/SiGe heterostructure by the laser irradiation.

Keywords: Si/SiGe, nanosecond laser, interdiffusion

The use of pulsed laser as a means for inducing interdiffusion in Si/SiGe heterostructures has been a topic of research for many years [1, 2]. Much work has been done in the field of interdiffusion in Si/SiGe heterostructures in microelectronic applications [3, 4]. Some studies have shown that interdiffusion can be induced by laser irradiation [5, 6]. The interdiffusion is induced by laser irradiation in Si/SiGe heterostructures.

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