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Investigation of the photostimulated crystallization and relaxation of internal mechanical pressure in silicon-on-insulator epitaxial nanostructures

ABSTRACT. The internal mechanical pressures arising in the formation of semiconductor structures used in electronics is a serious problem for many applications. These pressures are connected both with technological defects at the interfaces in hetero- or homoepitaxial systems and with the creation of disordered regions when using radiation technologies (ion metallization, high energy electrons, neutrons). The development of methods to assess the character and quantity of these pressures and their minimization is one of the most important tasks of electronics, since internal mechanical pressures exert a strong influence on surface tension, structural perfection and uniform distribution of film electrophysical characteristics over a wafer. It is demonstrated that laser annealing enables the substratum to be formed with fewer defects, as shown by the absorption spectra, and that the lower melting temperature achieved is due to a critical concentration of antibonding electron-hole pairs.

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