東京大学グローバルCOEプログラム　機械システム・イノベーション国際拠点

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Misfit and threading dislocations in thin film electronic materials

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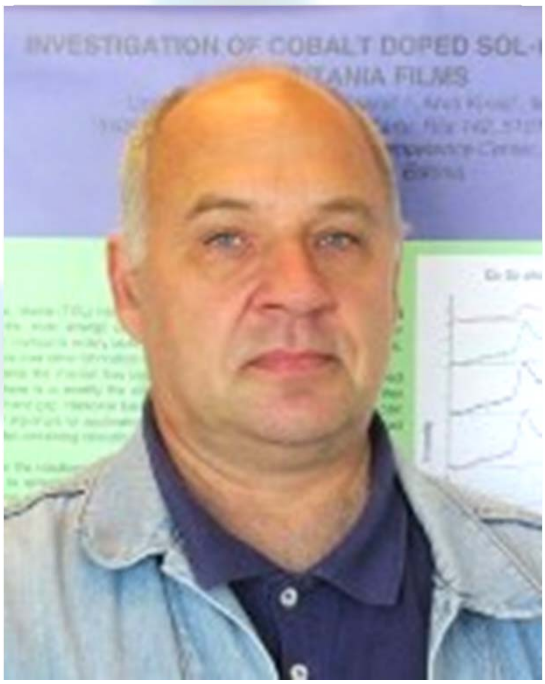
要旨

Relaxation of mechanical stresses in lattice-mismatched heteroepitaxial layers usually proceed via misfit dislocation (MD) formation at heterointerfaces and are typically accompanied by the generation of high density of threading dislocations (TDs) in the bulk of the material. These TDs are deleterious for wide variety of modern electronic and optoelectronic devices including light-emitting diodes and laser diodes. In recent years there have been substantial experimental and theoretical efforts to understand relaxation phenomena in semiconductor heterostructures and to reduce TD densities in device structures.

In present talk, novel approaches to modelling MD formation and TD reduction are considered. Results of these approaches are in a good agreement with extensive experimental data on stress relaxation in typical film/substrate semiconductor systems: epitaxial (001) heterostructures of III-V compounds and III-nitride heterostructures grown both in (0001) polar and semipolar orientations.



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