

# Nanocomposites and nanomaterials

## Growth and stability of chalcogenide semiconductor nanostructures

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The review of nanostructures based on chalcogenide semiconductors (PbS, PbSe, PbTe, SnTe, EuS, EuSe, YbS, YbSe, SrS, SrSe) is presented. It was experimentally realized the different types of nanostructures: **2D** (superlattices, quantum wells), **1D** (nanowires), **0D** (quantum dots) and dislocation nanogrids.

The diffusion intermixing of layers in superlattices has been studied by X-ray diffraction technique. The interdiffusion coefficients was determined basing on changing of the intensity of near-Bragg peak satellites in X-ray diffraction pattern.

It was shown that semiconductor nanostructures can increase the thermoelectric properties. For EuS-PbS superlattices Seebeck coefficient and electrical conductivity have been shown to increase with diminishing PbS layer thickness and to attain values exceeding several times those for one-layer thick PbS film.

The superconductivity has been discovered in the multilayer PbTe-PbS nanostructures [1] where there are no superconducting transitions in single-layer films.

The quantum-size effects in the nanostructures were observed by photoluminescence spectra [2-3]: the blue shifts of the emission lines are in good agreement with predictions for **2D** and **0D** quantizations.

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