# Doping Semiconductors on the Base of IV-VI for Thermoelectric

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The analysis of the topology vapor-phase thin films and nanostructures deposited on monocrystalline, polycrystalline, and amorphous substrates executed by surface condensates modeling methods on the mode of atomic force microscopy and cellular automata [1]. The proposed geometric model of the terrain allows to describe all stages of nanostructures formation in axiomatic form depending on the both the conditions growth and physical parameters of the system.

It was define the spatial forms of nanocrystallines, their mutual orientation, and orientation relative to the substrates in heterostructures. It is shown, the investigated values of technological factors is implemented in all cases the Folmer-Weber mechanism taking into account the orientation and energy influencing. Was proposed and implemented distribution histograms represent of height of nanoformations on their superposition of three Gaussian functions. It is shown, that the size of individual nanoislands defined processes of Ostwald maturation provided simultaneous action the diffusion and Wagner mass transfer mechanisms, whose contribution depends on technological factors and evaporation temperature deposition [2].

The relation for thermoelectric parameters, such as Seebeck efficient (S), specific conductivity (σ) received in semi-classic approximation on the base of Boltzmann transport equation by model of quantum well with high walls [2]. This model considers the change of Fermi energy due their wide. There were developed software package, and calculated the theoretical dependence of energy and thermoelectric parameters of the width of the quantum well. It was reasonable to use the model of the quantum well with high walls to describe the behavior of thermoelectric parameters of vapor-phase nano-condensates.

There is shown that doping of lead (tin) telluride by antimony and bismuth leads to a drastic change in the kinetic properties of nanostructures PbTe(SnTe):Sb(Bi), leading to an improvement of thermoelectric power.

The stable n-type of conductivity and high carrier concentration define the substitution of lead ions $Pb^{2+}$ by ions of $Sb^{3+}$($Bi^{3+}$) in cationic sub-lattice of main matrix $Sb_{Pb}^{3+}$($Bi_{Pb}^{3+}$) for solid solution of $PbTe$-$Sb_2Te_3$ $PbTe$-$Bi_2Te_3$ vapor-phase condensates deposited on sital and fresh chips of (0001) mica. And, the dominant scattering mechanisms explained of the diffuse scattering on surface and inter-grain boundaries.

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