

ABSTRACT

Report of pre-graduation practice: 43 pages, 20 figures, 34 references.

Work purpose: to study the phase composition, structure and mechanical stresses in the nanoscale CoSb_x (30 nm) ($3,0 < x < 3,5$) films on substrates SiO_2 (100 nm) / Si (001) after deposition and after annealing in vacuum.

Research methods: X-ray phase analysis - a method of Debye-Scherrer, X-ray Strain gauges, resistometry (four-probe method), scanning electron microscopy (SEM), Atomic-force microscopy.

The object of research: the processes of forming patterns of phase composition, structure and mechanical stresses in the nanoscale CoSb_x (30 nm) ($3,0 < x < 3,5$) films on substrates SiO_2 (100 nm) / Si (001) after deposition and after annealing in vacuum.

The subject of research: phase composition, structure and mechanical stresses in nanoscale CoSb_x (30 nm) ($3,0 < x < 3,5$) films on substrates SiO_2 (100 nm) / Si (001) after deposition and after annealing in vacuum.

Scientific novelty: first established the relationship between phase composition, structure and mechanical stresses films based CoSb_3 to increase their operational reliability.

Results: shown the dependence of the phase composition, structure and mechanical stresses on the physical and technical parameters of heat treatment. Found that after annealing above $(300-400)^\circ\text{C}$ a high level of mechanical tensile stresses.

Practical value: obtained scientific results have practical importance for the development of new polluting technologies of thermoelectric materials - functional components of thermoelectricity, as good thermoelectric devices.

Keywords: NANOSCALE FILM, SKUTTERUDITE , ANTIMONIDE, THE COEFFICIENT OF THERMOELECTRICAL EFFICIENCY