

Properties of filamentary nanocrystals of cadmium sulfide synthesized by vacuum evaporation and condensation

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Abstract

In recent decades, 1D structures, such as Nano whiskers, nanowires, Nano rods, etc., have attracted considerable interest of researcher due to their highly promising application in electronics, photonics, energy conversion and storage systems, medicine and pharmacology, and in modeling interaction with biomolecules and living cells. A prominent place among nanostructures is occupied by 1D nanostructures grown perpendicular to the substrate surface. These nanostructures are called Nano whiskers. Below reported about physicochemical studies of the ensemble of filamentary nanocrystals of cadmium sulfide synthesized by vacuum evaporation and condensation. It is presented the results of technological experiments, the results of electronic microscopy and the results of electron diffraction studies. It is shown that by means of vacuum evaporation and condensation it is possible to synthesize filamentary nanocrystals of diameter from 10 nm to few μm and of the length of few mm. It is revealed technological conditions necessary for the synthesis of filamentary nanocrystals. It is determined relation between growth rate of filamentary nanocrystals and their linear characteristics. It is shown that mechanism of growth of nanocrystals synthesized by used method is in full accordance with model views of classical mechanism vapor-liquid-crystal of Givargizov-Chernov.

For revealing of crystalline perfection of filamentary nanocrystals it is used electron diffraction method, at so doing for increasing of the level of analytical signal it is used superposition of diffraction patterns from ensemble of filamentary nanocrystals. The method proposed permitted establish high degree of perfection of filamentary nanocrystals synthesized by vacuum evaporation and condensation.

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