

## EPITAXIAL FILMS AND NANOSTRUCTURES BASED ON YTTERBIUM CHALCOGENIDES

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Europium chalcogenides (YbS, YbSe, YbTe) are of great interest to researchers, possessing a unique combination of electrical, magnetic, optical and other properties. Their use in a thin-film state opens up wide opportunities for modern microelectronics and other branches of new technology. This work investigates the possibility of obtaining single-crystal films and nanostructures based on these materials by the methods of thermal (electron-beam) evaporation and vacuum condensation on single-crystal substrates of KCl, BaF<sub>2</sub> and mica. The results of the studies showed that europium chalcogenides grow on these substrates in the form of polycrystalline (at best textured) films. No changes in the condensation conditions (temperature, speed, vacuum) led to an improvement in the quality of europium chalcogenide films. The problem was solved by using buffer layers of lead chalcogenides (PbS, PbSe, PbTe), which grow on these substrates in the form of single-crystal films. Lead and europium chalcogenides have the same type of bond (ionic-covalent) and type of crystal lattice (NaCl) with close periods, which ensured the implementation of the layer-by-layer mechanism of their growth on each other and the production of not only single-crystal layers of these materials, but also nanostructures of various types: superlattices (Fig. 1), quantum wells, quantum dots.

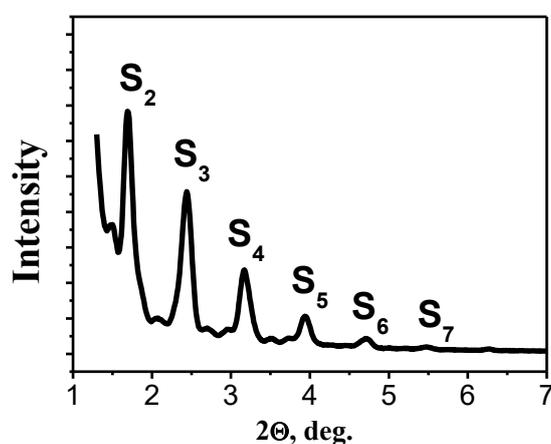


Fig. 1 - X-ray diffraction pattern of the YbS-PbS/(001)KCl superlattice with a period of 11.4 nm near the primary beam. Sn - satellite reflections.