QUANTUM DOTS – PROSPECTIVE LIGHT-CONVERSION MATERIALS

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Quantum dots of A2B6 semiconductors became an object of interest of the groups experienced in bulk materials. Considerable success was achived in the quantum, dots synthesis and application including CdTe [1,2], CdSe [3], CdS [4] and $AgInS_2$ [5]. CdTe/CdS core-shell quantum dots implemented into a light emitting device demonstrated multi-channel electroluminescence with a light-green emission color [6].

The CdSe/ZnS nanostructures of Core-Shell type, that have multi-wave emission, are described and a scheme of possible energy transitions in the studied system is presented. CdSe nuclei were synthesized by mixing cadmium and selenium precursors without creating an inert atmosphere. The cadmium complex with sulphanilamide was used as a cadmium precursor and simultaneously as a stabilizing ligand. To grow the shell, zinc stearate and thiourea were gradually added to the solution of cadmium selenide nuclei in octadecene at 200 °C. The obtained CdSe/ZnS nanostructures emit three fluorescence peaks in the visible range. They are attributed to exciton transitions in the nucleus, recombination at defects of the boundary between the core and the shell, and recombination at defects of the shell. Such property provides CdSe/ZnS nanocrystals with a wide range of functionalities [7].

Quantum dots embedded in polymer and ionic crystals demonstrate useful light conversion properties.

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