

POLYMER NANOCOMPOSITE BASED ON STYRENE WITH BUTYL METHACRYLATE AND INORGANIC SEMICONDUCTOR CdS

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Abstract. We present experimental results on copolymer-based nanocomposite made of styrene with butyl methacrylate (1:1) and inorganic semiconductor CdS. Thin film composite samples have been characterized by UV-Vis absorption and photoluminescent spectroscopy, as well as by transmission electron microscopy. Transmission electron microscope examination confirms a relatively narrow distribution of CdS nanoclusters in the SBMA matrix, which covers the range 2-10 nm. On the other side, the average CdS particles size estimated from the position of first excitonic peak in the UV-Vis absorption spectrum was found to be 2.8 nm and 4.4 nm for two samples with different duration of thermal treatment, which is in good agreement with PL experimental data. The PL spectrum for CdS nanocrystals is dominated by near-band-edge emission. The relatively narrow line width (40-45 nm) of the main PL band suggests the nanoparticles having narrow size distribution. On the other side, relatively low PL emission from surface trap states at longer wavelengths were observed in the region 500-750 nm indicating on recombination on defects.

Key words: nanocomposite, polymer matrix, photoluminescence, exciton.