

Photoluminescence of A_2B_6 Nanocrystals

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Advances in synthesis technologies of high-quality A_2B_6 nanocrystals (NCs) have stimulated their wide use in various fields of opto- and nanoelectronics. Among the most promising areas of A_2B_6 NC applications various light-emitting devices should be noted, such as LEDs, white light sources, low-threshold lasers etc. Due to the narrow emission spectrum of monodisperse NCs (half-width of the radiation band is about 20 nm) NC-based LEDs are characterized by rich colors with a much better spectral purity than liquid crystal or organic LEDs. Besides, NC-based LEDs are characterized by a number of advantages comparing to classic LEDs based on $p-n$ junctions. They have high quantum yield of radiation, low power consumption, long useful lifetime, *high-speed operation*, resistance to vibrations and shocks. LED radiation of almost arbitrary color could be obtained by selecting the material of NCs and their sizes. Some of the light-emitting properties of A_2B_6 NCs have been described in our review [1]. In this paper we present new results of the studies of optical, luminescent and structural characteristics of A_2B_6 NCs incorporated in protective inorganic matrices or directly synthesized in polymer matrices [2]. Moreover, results are highlighted of research and development methods of stabilization of A_2B_6 NC optical characteristics, surface passivation and efficiency increasing by NCs incorporation in the matrix of alkali metal salts. A technology is described of synthesis in polymer matrices of CdS NCs doped with Cu and Zn impurities [3]. The results of X-ray analysis and comprehensive studies of optical absorption and photoluminescence spectra of CdS NCs are described (the results being dependent on concentration of copper and zinc impurities introduced). It has been found that copper atoms are concentrating on the surface of CdS NCs. This leads to passivation of vacancy type defects, which serve as surface radiative centers. *On the contrary*, zinc penetrates into the bulk of CdS NCs creating additional surface defects (the defects being the radiative recombination centers).

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