

## Photoluminescent Properties of the CdTe Nanocrystals Incorporated Into Inorganic Matrices

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The modern optoelectronics devices made with polymers or inorganic materials and A2B6 semiconductor nanocrystals (NCs) have attracted considerable attention. It is because nanoparticle composites combine key properties required for including low power, low voltage and low weight. The improvements of growth methods, methods of stabilization and other factors result in significant increase of photoluminescence quantum yield of the CdTe NCs grown in colloidal solutions. However, these solutions are ineffective in practical use due to the low reliability and stability.

The synthesis of colloidal solution with CdTe NCs was carried out in a three-neck baffled reactor as earlier described in [1]. In our case, the Cd<sup>2+</sup> source was the salt CdI<sub>2</sub>, and the Te<sup>2-</sup> source was H<sub>2</sub>Te gas prepared electrochemically in a galvanostatic cell (reactions at the electrodes: Te + 2e<sup>-</sup> + 2H<sup>+</sup> → H<sub>2</sub>Te at the cathode (+) and H<sub>2</sub>O → 2H<sup>+</sup> + 1/2 O<sub>2</sub> at the anode (-)). Thioglycolic acid (TGA) was used to stabilize the surface of the CdTe NCs during the synthesis. The preparation of the crystals was performed by mixing 25 mL of a saturated KCl solution (25%) with 5 mL of a CdTe NCs solution (C<sub>CdTe</sub> = 1,07 × 10<sup>-3</sup> mol/L based on C<sub>Te<sup>2-</sup></sub>).

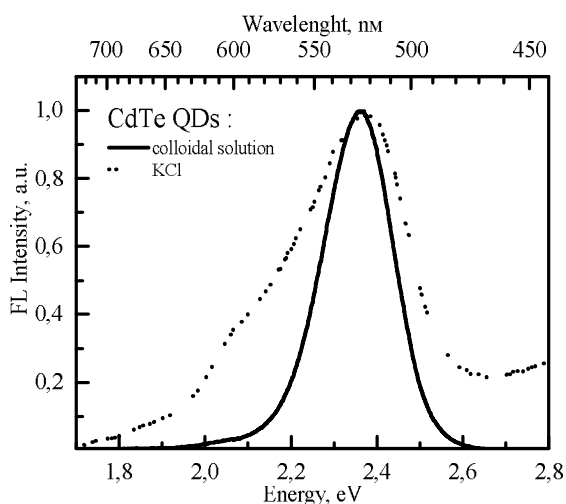


Fig. 1. PL Spectra of CdTe QDs in colloidal solution and KCl matrix.

Figure 1 shows the PL spectra of the CdTe NCs in colloidal solution and KCl matrix, taken at room temperature. We have compared PL of starting colloidal solutions of CdTe QDs with the PL of the corresponding CdTe QDs embedded in KCl. Broadening of the main peak was caused evidently by a changing of stabilization conditions. But, obtained KCl powder with embedded CdTe NCs is ready for practical use, especially after mixing with moisture resistant polymers, and can be used as luminescent phosphors.

1. Effect of Thioglycolic Acid on the Stability and Photoluminescence Properties of Colloidal Solutions of CdTe Nanocrystals / O.A. Kapush, L.I. Trishchuk, V.N. Tomashik, Z.F. Tomashik // *Inorganic Materials*, 2014, Vol. 50, No. 1, pp. 13–18.