"Nanocomposites and nanomaterials"

Synthesis of ZnSe nanocrystals for hybrid polymer applications

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Zinc selenide (ZnSe) possesses unique optical and electrical properties and exhibits great potential applications, such as blue-green light emitting diodes, photoluminescent and electroluminescent devices, lasers, thin films, solar cells, nonlinear optical crystals and infrared optical materials [1,2].

In this paper, the choice of the most effective synthesis and passivation pathways for ZnSe nanorods for polymer system are presented. ZnSe nanocrystals are successfully synthesized by using two precursors zinc stearate and selenourea in the presence of octadecylamine. The reaction was carried out within 1 hour at temperature 250 °C.

The crystalline phase of the synthesized ZnSe nanoparticles was confirmed by X-ray diffraction (XRD) and shows that ZnSe nanocrystals (NCs) possesses the wurtzite structure. The transimmsion electron microscope (TEM) was used to determine the size and shape of ZnSe NCs. The results indicate that we achived successfully one-dimensional (1D) nanorods with length about 15-20 nm, and with the width of about 2 nm. Additionally, the as-prepared ZnSe NCs show good optical properties. We observed the peak of emission at about 460 nm and excitonic peak of about 360 nm.

FT-IR results confirmed the presence of characteristic groups from octadecylamine on the ZnSe NCs surface. The proper surface functionalization of ZnSe is necessary in order to incorporate them into a polymer matrix without aggregation.

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2. *Talapin D. V., Lee J. S., Kovalenko M. V., Shevchenko E. V.* Prospects of Colloidal Nanocrystals for Electronic and Optoelectronic Applications // Chem. Rev.-2010.-**110**.-P.389–458.