Effect of TEA on the blue emission of ZnO quantum dots with high quantum yield

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Abstract

This work reports the luminescence, morphology and synthesis of ZnO quantum dots using a simple wet chemical method and different concentrations of Triethanolamine (TEA) as surfactant. Those nanoparticles emitted a strong blue emission band centered at 429 nm when they are dispersed in hexane. Spherical quantum dots with sizes ranging from 3 to 7 nm were obtained for concentrations from 0 to 0.7 ml. of TEA, whereas a mixture with oval-like nanoparticles was observed from concentrations above of 1.1 ml of TEA. It was also possible to control the values of the band gap in ZnO quantum dots depending on the content of TEA. Based on the high quantum yield of 81% measured for those ZnO nanoparticles respect to quinine sulfate dye (QS), it is suggested that such nanoparticles could be used for biolabeling and ZnO based LEDs.