Influence of Polymeric Matrix on Structural and Photoluminescent Properties of Polymer-Quantum Dot (nano)composites

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In recent years, semiconductor quantum dots (QDs) have attracted great interest due to their unique properties [1]. Their dispersion into a polymeric matrix is of great interest for several optoelectronics applications. Despite its importance, there has been relatively little work done on charge transport in the QD polymeric films [2], which is mainly related with their dispersion. What, consequently, affects their structure morphology and electric properties.

In this work, polymer-quantum dot (nano)composites films using optically transparent polymers in the visible spectral range and CdTe QDs with controlled particle size and emission wavelength, were prepared *via* solvent cast method. Photoluminescent (PL) measurements of the (nano)composites indicate different emission intensity. Moreover, a blue shift of the emission peak occurred, which is attributed to the QDs environmental changes. The morphological and structural properties of the CdTe (nano)composites were evaluated by various techniques. The results demonstrated that PMMA is the most promising matrix, allowing better QDs dispersion. Contrarily, TPS induces their phase separation. Electrical properties of the (nano)composites were assessed.

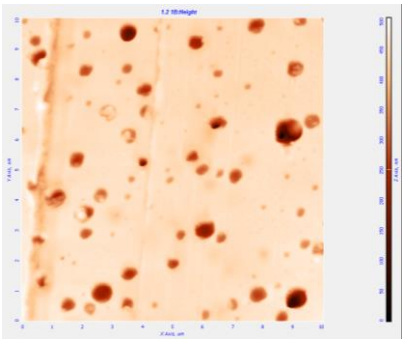

Fig1. Atomic force microscopy image of QDs-PMMA film.

1. Z. Kang, Y. Zhang, H. Menkara, B. Wagner, C. Summers, W. Lawrence and V. Nagarkar, *Applied Physics Letters*, 98 (2011).

2. R. Moradian, M. Elahi, A. Hadizadeh, M. Roshani, A. Taghizadeh and R. Sahraei, *International Nano Letters*, 3:56 (2013).

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