

Synthesis, characterization and promising properties of Fe₃O₄/CdSe nanocomposites.

Nowadays, magnetic semiconductors nanocomposites have become a new class of materials of great importance promising with new properties and exploiting unique incorporation between materials. For example, one can make use of a variety of spin-related phenomena, not readily available in other materials. In the present work, bi-functional magnetic–luminescent nanocomposites with Fe₃O₄ nanoparticles as the cores and CdSe as the shells have been synthesized by a facile direct precipitation method. Transmission electron microscopy (TEM) images revealed that the obtained bi-functional nanocomposites had a core–shell structure. The flower shape has been ascribed to the inhomogeneous growth of CdSe due to the presence of many active sites which turn to be nucleation centers for the CdSe on the surface of the nano-magnetite. The X-ray diffraction (XRD) patterns ensured the cubic spinel structure of the Fe₃O₄ core. Magnetic measurements indicated that the presence of CdSe in the composite has reduced its magnetic properties. Optical measurements of the Fe₃O₄/CdSe nanocomposites showed that the prepared samples have dual functions, optical tunable band gap similar to the semiconductor quantum dots and magnetic properties due to Fe₃O₄ nanoparticles. According to the values of Stokes shift of the new hybrid composites, one can suggest that they may be promising in conversion and storage energy applications and in biomedical. labels.

Summary

i succeeded to couple between nanoparticles of fe₃o₄ , and quantum dots by preparing core shell hybrid nanostructure of a composite of fe₃o₄/CdSe. also,i studied some structural, magnetic, and electrical properties of the nano- particle sample. finally i fabricated a module of solar cells as potential applications.

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