## Photoluminescence Properties of Polythiophene/Tin Oxide (PTh/SnO2) Polymer Nanocomposites

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## Abstract

In the present article, polythiophene/tin oxide (PTh/SnO2) polymer nanocomposites are synthesized through an in-situ chemical polymerization of thiophene monomers using anhydrous FeCl3 as an oxidant. The structural, thermal and optical characterization of polymer nanocomposites is carried out through X-ray diffraction, field emission scanning electron microscopy, thermogravimetric analyzer and fluorescence emission spectroscopy. XRD spectra reveal the formation of pure polythiophene and an incorporation of SnO2 nanofiller into the polythiophene matrix. The formation of irregular rod and chain like structures are noticed through FESEM images. TGA results reveal that the thermal stability of polymer nanocomposites varies because of the strong interaction between nanofiller and polymer matrix. Fluorescence emission spectra show the emission intensity of polymer nanocomposites decreases as the concentration of SnO2 nanofiller increases due to the variation of in electron-hole recombination and conjugation length of polymer chain. Our results of fluorescence emission analyses suggest the PTh/SnO2 polymer nanocomposites could be potential material for photonic applications.



**Figure**: Photoluminescence spectra of PTh/SnO2 samples with different SnO2 samples.

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