**Abstract**

In this work, CuO–SnO2 composite thin films were prepared by spray pyrolysis method using copper acetate and tin chloride dihydrate as raw materials. The structural, morphological and optical properties of the prepared nanocomposite were systematically investigated by X-ray diffraction (XRD), Scanning electron microscope (SEM) and UV–Vis absorption spectra analysis. The calculated grain size was in the range from 27 to 54 nm. SEM images reveal a spherical shaped morphology with an average diameter of around 10–15 nm. EDX analysis confirms the composition of the deposited thin films. The band gap of the composite thin films obtained from the optical absorption spectra is observed to be in the range from 2.98 to 3.67 eV. The photocatalytic activity of the nanocomposite was investigated using congo-red (CR) and malachite green (MG) under UV light irradiation. The results showed that the CuO–SnO2 composite exhibits superior photocatalytic performance towards CR such as high degradation efficiency (97%) and long term stability (only 3% loss) after a seven cycles test. This enhanced photocatalytic activity can be attributed to the low recombination probability of photo-induced carriers due to the efficient charge transfer in the nanocomposites. The improved photocatalytic mechanism of CuO–SnO2 composite is also discussed in brief.