Abstract

Surfactant controlled synthesis was done to prepare $CaO-SnO_2$ nanocatalyst by using hydrothermal method at different concentrations of sodium dodecyl sulfate (SDS) and at CMC of SDS by keeping all other reaction parameters constant. Moreover another set was synthesized by varying the concentration of precursors: penta hydrated tin chloride ($SnCl_4.5H_2O$) and dihydrated calcium chloride $CaCl_2.2H_2O$ while all other reaction conditions were same. The effect of these reaction conditions on the distribution of particle size and shapes of these nanocatalysts were investigated by using different techniques: X-ray diffraction (XRD), transmission electron microscopy (TEM), scanning electron microscopy (SEM), energy dispersive x-ray (EDX), thermo gravimetric analysis (TGA) and fourier transform infrared (FTIR) spectroscopy. The application of $CaO-SnO_2$ nanocatalyst was observed for the degradation of explosive materials: 2,4-dinitrophenylhydrazine (DNPH) using acetone as solvent and for the development of latent finger prints on different substrates. $CaO-SnO_2$ nanocatalyst found to act as a good reacting agent for degrading the DNPH. Catalytic activity of these nanocatalysts was checked by using UV-spectrophotometer. These nanoparticles degrade the toxic chemicals up to 25.65% per minute.