Optimisation of the photonic efficiency of TiO_2 decorated on MWCNTs for Methylene blue photodegradation

ABSTRACT

MWCNTs/TiO_2 nanocomposite was prepared by oxidising MWCNT in H_2SO_4/HNO_3 then decorating it with TiO_2-p25 nanopowder. The composites were characterised using XRD, TEM, FT-IR PL and UV−vis spectroscopy. The TEM images have shown TiO_2 nanoparticles immobilised onto the sidewalls of the MWCNTs. The UV-vis spectrum confirms that the nanocomposites can significantly absorb more light in the visible regions compared with the commercial TiO_2 (P25). The catalytic activity of these nanocomposites was determined by photooxidation of MB aqueous solution in the presence of visible light. The MWCNTs/TiO_2 (1:3) mass ratio showed maximum degradation efficiency. However, its activity was more favourable in alkaline and a neutral pH than an acidic medium.

Keyword: Nanocomposite; Spectrum; Spectroscopy