Optimisation of the photonic efficiency of TiO₂ decorated on MWCNTs for Methylene blue photodegradation

ABSTRACT

MWCNTs/TiO₂ nanocomposite was prepared by oxidising MWCNT in H₂SO₄/HNO₃ then decorating it with TiO₂-p25 nanopowder. The composites were characterised using XRD, TEM, FT-IR PL and UV-vis spectroscopy. The TEM images have shown TiO₂ 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 TiO₂ (P25). The catalytic activity of these nanocomposites was determined by photooxidation of MB aqueous solution in the presence of visible light. The MWCNTs/TiO₂ (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