**Abstract**

Titanium oxide nanoparticles with size below 50 nm were synthesized by hydrothermal method with different pH values of the reaction solution. The nanoparticles were characterized by X-ray diffraction (XRD), Scanning electron microscopy (SEM), Photoluminescence (PL) and Ultraviolet spectroscopy (UV) after calcination at 500°C for 2h. The synthesized TiO2 nanoparticles were related to the anatase phase and their crystalline structure was characterized by XRD. Bunched, Spherical and uniformly shaped TiO2 nanoparticles were observed in the SEM images. The photocatalytic behaviour of the synthesized TiO2 nanoparticles was examined by the photoluminescence method. As photocatalytic degradation is one of the most efficient processes for the degradation of dyes, the effect of these nanoparticles on the photocatalytic degradation of various dyes with different chromophores such as, triphenyl methane (Methyl violet), heteropolyaromatic dyes (Methylene blue, Rhodamine B) and azoic dyes( Methyl orange) was studied under Ultra violet light irradiation. The photo oxidation reactions were observed under UV lamp at a wavelength of 250 nm. The values of efficiency of degradation of the dyes were calculated and the values of the percentage of photocatalytic degradation for different pH values of the reaction solution were compared. The rate of degradation is found to increase on increasing the pH value. This photocatalytic degradation of dyes using nanoparticles is a low cost, eco-friendly and cost effective process in the removal of toxic dyes.