

ABSTRACT

Till date Maghemite nanoparticles were not used for the purpose but it has been found that it is readily efficient in removing Arsenic removal from drinking water. The Maghemite nanoparticles are synthesized by both Chemically and mechanical attrition, but TiO_2 nanoparticles are synthesized by ball milling. Compositional characteristics of the as prepared Maghemite and TiO_2 nanoparticles were studied by FTIR spectroscopy indicate the presence of Fe-O and Ti-O bond in the sample. The crystalline size, particle size, lattice strains and the homogeneity of the resulting nanoparticles were studied by X-Ray diffraction (XRD) and transmission electron microscopy (TEM). A pattern decomposition procedure based on single line analysis method using a pseudo-Voigt profile shape function and subsequent single line analysis based on equivalent Voigt representation is used for the determination of crystallite size and the lattice strain. The UV-Visible and PL spectroscopy was studied and it was found that both the particles do not absorb UV light thus can be used in modern water purifiers. The magneto-optic switching study indicates that the Maghemite nanoparticles can be used as a magneto-optic switching device for the future application. The arsenic removal study for different arsenic conc (viz. 40 ppb, 60 ppb, 240ppb) of the ball milled samples also opened the way for these nanomaterials to be used in modern water purifiers.