

## Iron Oxide Nanoparticles: Synthesis, Properties, and Environmental Application

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**Abstract :** Water is the most important and essential resources for existing of life on the earth. Water quality is gradually decreasing due to increasing urbanization and industrialization and various other developmental activities. It can pose a threat to the environment and public health therefore it is necessary to remove hazardous contaminants from wastewater prior to its discharge to the environment. Recently, magnetic iron oxide nanoparticles have been arise as significant materials due to its distinct properties. This article focuses on the synthesis method with a possible mechanism, structure and application of magnetic iron oxide nanoparticles. The various characterization techniques including X-ray diffraction, transmission electron microscopy, scanning electron microscopy with energy dispersive X-ray, Fourier transform infrared spectroscopy and vibrating sample magnetometer are useful to describe the physico-chemical properties of nanoparticles. Nanosized iron oxide particles utilized for remediation of contaminants from aqueous medium through adsorption process. Due to magnetic properties, nanoparticles can be easily separate from aqueous media. Considering the importance and emerging trend of nanotechnology, iron oxide nanoparticles as nano-adsorbent can be of great importance in the field of wastewater treatment.

**Keywords :** nanoparticles, adsorption, iron oxide, nanotechnology

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