SYNTHESIS, CHARACTERIZATION OF ZERO-VALENT IRON NANOPARTICLE FOR REMOVAL HEXAVALENT CHROMIUM FROM AQUEOUS MEDIUM

Claudio Adrian Ruiz-Torres¹, Jesús María Guajardo-Pacheco², René Fernando Araujo-Martínez², Facundo Ruiz²

¹Facultad de Ciencias, Universidad Autonoma de San Luis Potosí (UASLP), Avenida Manuel Nava 6, Zona Universitaria, 78290 San Luis Potosí, SLP, Mexico.

The population increase as urban and industrial activities have led to elevated concentrations of a wide range of contaminants in wastewater and groundwater within which highlights the presence of Cr (VI) due to its high toxicity, which affected the health of millions of people worldwide. Nanotechnology has proved an effective tool for the treatment of wastewater. A particular case is the use of zero-valent iron (Fe⁰) and iron oxides, which has received wide attention in recent years because of its high surface area and specific affinity for toxic contaminants in aqueous systems. In this work we present a cost-effective synthesis methodology of Fe⁰ nanoparticles. Fe⁰ nanoparticles were synthesized by the aqueous chemical reduction method of ferric salts at room temperature in the absence of inert conditions. The obtained nanoparticles were characterized using transmission electron microscopy (TEM), X-ray diffraction (XRD), ultraviolet–visible (UV–Vis) absorption spectroscopy, and thermal gravimetric analysis (TGA). The UV–Vis spectrum of Fe⁰ nanoparticles showed its absorption maxima at 240 nm. The X-ray diffraction pattern for Fe shows a peak at 44 °, demonstrating the presence of Fe⁰. It also was proven the efficacy of Fe⁰ nanoparticles as a cost-effective solution in the removal of Cr (VI) in aqueous medium, evaluating certain factors which influencing the removal of Cr (VI), e.g., pH, amount of Fe⁰, and the contacting time with Cr (VI), looking to optimize the operation condition for the use of Fe⁰.

Keywords: Zero-valent iron nanoparticle, Characterization, Remediation

References:


Presenting author’s email: claudio_torrs@hotmail.com