Biotech/Pharma

Encapsulated nZVI Beads for Efficient Dye Removal
Technology Domain: Nanotechnology
Patent Application Number: 201741005011
Status (Patent/TRL): Granted Patent / TRL 3
Technology Summary: This invention provides a novel process for removing dyes from industrial effluents using nano zero valent iron (nZVI) - calcium alginate beads. The key technical solution involves synthesizing nZVI by mixing ferrous sulfate and EDTA, then immobilizing these nZVI particles within 2-3 mm calcium alginate beads. The key inventive feature is the immobilization of nZVI within the biocompatible calcium alginate matrix, which likely enhances stability, prevents aggregation, and facilitates easy separation from the treated effluent. As a result, dyes are effectively bound to the surface and trapped within the beads, leading to increased dye removal percentages with higher initial nZVI concentration and longer contact time. The use of this invention offers an environmentally friendly and efficient method for wastewater treatment, providing a straightforward way to achieve dye-free effluents.