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Investigation of Contaminants Interference on Water Treatment by Supported Nanoscale Zero Valent Iron

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Abstract: *Nitrate and phosphate are severe contaminants which cause eutrophication and series environmental problems. The treatment of these pollutants by supported nanoscale zero valent iron (nZVI) on activated charcoal (n-Fe^0/C) was suggested as an effective and efficient tool more than unsupported nanoscale Fe^0, because of its higher settling rates and improved hydraulic conductivity, the supported nano iron could be applied with easier operation in continuous treatment process of wastewater and in groundwater. In fact, wastewater and groundwater include numerous compounds other than nitrate and phosphate, and they interfere with their remediation process and removal efficiency by supported nano iron. Through this research, n-Fe^0/C was synthesized and characterized via transmission electron microscopy (TEM)), X-ray diffraction (XRD) and Brunauer–Emmett–Teller (BET) surface characterization then applied in batch experiments containing nitrate and nitrate with phosphate coexisting with copper compounds, calcium carbonates, sulfates, humic acid and domestic wastewater. Interference studies were carried out to investigate the extent of influence of each interfering substance. In general, the performance of removal for phosphate remained unchanged (nearly 95%), whereas nitrate decreased from 70% to about 50% in average after 90 min of batch experimental time for almost all interfering substances at high common concentrations except for copper compounds, which increased the removal efficiency that varied from 75 to 100%, depending on phosphate presence and type and amount of copper compound used.*

Keywords: Nitrate; Phosphate; Nanoscale zero valent iron; Contaminants interference; Copper compounds.