



Studying the reaction kinetic of synthesized NZVIs nanoparticles with azo dyes

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Abstract

Nowadays numerous and extensive research were reported in the field of using nano zero valent iron (NZVI) particles technology as a strong reducer for most of water pollutants in pilot and laboratory scale [1,2]. Nevertheless, there is not notable investigation about the mechanism and kinetics of these reactions. Therefore, it is necessary to study the reactionS kinetics. In this paper synthesize and characterization of nano zero valent iron particles were studied by TEM, SEM and XRD analysis. Then we investigated the reaction kinetic of the removal of dyes by NZVI. Dyes have been used widely in the dyeing industry in the North West of Iran. So they are one of the important contaminants in wastewater of this area. In this reaction, the destruction of the azo bond (N=N) in the chromophore of azo dyes leads to decolorization of the dye solutions. The iron particle is oxidized while the dye molecule is reduced. The dye molecule receives electrons from the iron and combines with H^+ from an acid to form the transitional product. This product gains electrons and combines with H^+ again, forming the terminal products [3]. Additionally, in the presence of Fe^0 , aromatic azo compounds are susceptible to reduction to produce aromatic amines which are easily degraded by microorganisms. Batch kinetic studies show that Reaction kinetics is very fast and the decolorization rate follows pseudo seond-order equation [4].

References

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