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ABSORPTION OF NITRIC OXIDE INTO AQUEOUS SOLUTIONS OF $[Fe^{II}(EDTA)]^{2-}$ WITH SODIUM HYPOPHOSPHITE AND REDUCTION KINETICS OF $[Fe^{III}(EDTA)]^{-}$ BY SODIUM HYPOPHOSPHITE

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Abstract

The absorption of NO into aqueous solutions of $[Fe^{II}(EDTA)]^{2-}$ and sodium hypophosphite was carried out in a bubble reactor and sodium hypophosphite was used as a reductant to reduce $[Fe^{III}(EDTA)]^{-}$ generated by $[Fe^{II}(EDTA)]^{2-}$ oxidation. The results show that sodium hypophosphite can effectively reduce the $[Fe^{III}(EDTA)]^{-}$ and improve the absorption efficiency of NO. The reduction rate of $[Fe^{III}(EDTA)]^{-}$ increases with the increase in temperature and pH. The stoichiometry and reduction kinetics of $[Fe^{III}(EDTA)]^{-}$ by sodium hypophosphite was achieved according to the influence of different sodium hypophosphite concentrations, temperature, and pH on the reduction rate. The activation energy of reducing $[Fe^{III}(EDTA)]^{-}$ by sodium hypophosphite is calculated to be 33.172 kJ/mol. The reduction kinetics of $[Fe^{III}(EDTA)]^{-}$ by sodium hypophosphite in the air was obtained, and the agreement between the experimental results and simulation results was excellent.

Key words: $[Fe^{II}(EDTA)]^{2-}$, kinetics, nitric oxide, reduction, sodium hypophosphite

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