



Mineralization of Acid Green 50 by $\text{Fe}_2\text{O}_3\text{-Al}_2\text{O}_3$ as a highly active hetero-Fenton catalyst

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ABSTRACT

The oxidation of Acid Green 50 (AG50) textile dye using $\text{Fe}_2\text{O}_3\text{-Al}_2\text{O}_3$, prepared from the calcination of $\text{Fe}^{\text{III}}\text{-Al}(\text{OH})_4\text{-gel}$, as a highly active catalyst in the heterogeneous Fenton oxidation process was studied. It was found that the ferric ions loaded on the surface of neutral $\text{Al}(\text{OH})_4^-$ gel and then calcined at different temperatures is an efficient catalyst in the heterogeneous Fenton reaction for the mineralization of aqueous AG50. According to the X-ray analysis, the iron catalyst is a mix of Fe_2O_3 and Al_2O_3 . The thermal treatment gives long-term stability to the catalyst because it minimizes iron leaching from the catalyst. The catalyst was used in four successive recycling heterogeneous Fenton oxidations generating a colorless solution with the removal of over 95% of total organic carbon (TOC) in 90 min. This shows that the $\text{Fe}_2\text{O}_3\text{-Al}_2\text{O}_3$ catalyst is highly efficient for the degradation of AG50 after being used in several cycles during the dye treatment. It was also found that the degradation of AG50 increased by increasing the hydrogen peroxide concentration.

Keywords: Acid Green 50; $\text{Fe}_2\text{O}_3\text{-Al}_2\text{O}_3$; $\text{Fe}^{\text{III}}\text{-Al}(\text{OH})_4\text{-gel}$; Heterogeneous Fenton

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