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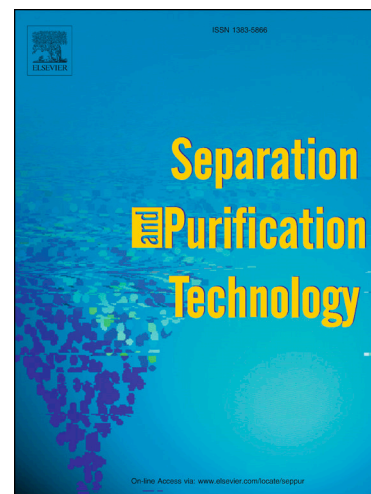
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Heterogeneous photo-Fenton degradation of organic pollutants with amorphous Fe-Zn-oxide/hydrochar under visible light irradiation

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Abstract:

Amorphous Fe-Zn-oxide/hydrochar was prepared by a hydrothermal method and used as a heterogeneous photo-Fenton catalyst. The catalyst exhibited excellent activity for the degradation of various organic pollutants including Rhodamine B (RhB), methylene blue, antipyrine, and phenol at near neutral pH in the simultaneous presence of H₂O₂ and visible light irradiation. The influences of pH on the degradation and adsorption of pollutants, and the formation of hydroxyl radical (•OH) were investigated. Meanwhile, the roles of surface Fe²⁺, dye photosensitization, •OH, and photogenerated electrons in this photo-Fenton process were explored. The results indicate that the photogenerated electrons could accelerate the regeneration of surface Fe²⁺ and the formation of •OH. It was found that phenol was mostly degraded by •OH in solution. Different from phenol, the degradation of RhB at pH 6.5 was mainly due to the reaction of excited RhB* with H₂O₂, while the contribution of •OH increased significantly with decreasing pH. This study suggests the potential application of amorphous metal oxides/carbonaceous materials in catalytic degradation of organic pollutants.

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