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**Facile synthesis of magnetic sludge-based carbons by using Electro-Fenton
activation and its performance in dye degradation**

Lin Gu^{1,2}, Chengxu Li¹, Haifeng Wen¹, Pin Zhou², Daofang Zhang^{1*}, Nanwen Zhu²,
Hong Tao¹

¹*School of Environment and Architecture, University of Shanghai for Science and Technology,
Shanghai 200093, P.R. China*

²*College of Environmental Science and Technology, Shanghai Jiao Tong University, Shanghai
200240, P.R. China*

Abstract

Highly stable iron based magnetic carbon were prepared by sequential Electro-Fenton (EF) activation and pyrolysis of sewage sludge. The applied voltage exerts great influence on EF treated sludge flocs and thus poses significant effect on physiochemical properties of the as-prepared carbons. High insertion rate of iron into sludge from EF activation resulted in carbons with highly dispersed iron oxides, which had average size of iron nanoparticles being 4.77 nm. The carbon also presented well developed porosity which had Brunauer-Emmett-Teller (BET) surface area attaining 341 m²/g. Carbons prepared by traditional Iron Impregnation (IM) were used as comparison to gain further insight into their catalytic role as Fenton-like catalyst. Results showed that EF-activated sludge carbon could yield 96.1% of Methyl Orange (MO) removal in 60 min together with only 1.4% of iron leaching. After three cycles, the MO removal can still reach 80% with EF-activated carbons.

Key words: Electro-Fenton; Sewage Sludge; Methyl Orange; Carbon

*Corresponding author phone: +86-21-55271722. Fax: +86-21-55271722 ;

Email: Zhangdf-usst@163.com (D.F. Zhang)

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