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MDPI

Supplementary materials

Reconstruction of Electronic Structure of MOF-525 via Metalloporphyrin for Enhanced Photoelectro-Fenton Process

Chenhui Qi [1], Shuaipeng Han [1], Jialiang Lin [1], Jianhua Cheng [1,2,*], Kesi Du [1,*], Yongyou Hu [1] and Yuancai Chen [1]

[1] Guangdong Provincial Key Laboratory of Solid Wastes Pollution Control and Recycling, College of Environment and Energy, South China University of Technology, Guangzhou 510006, China; qichenhui0414@163.com (C.Q.); alivesphan@163.com (S.H.); ljl2ax@hotmail.com (J.L.); ppyyhu@scut.edu.cn (Y.H.); chenyc@scut.edu.cn (Y.C.)

[2] South China Institute of Collaborative Innovation, Dongguan 523808, China

* Correspondence: jhcheng@scut.edu.cn (J.C.); dukesi@scut.edu.cn (K.D.)

Text S1

Before the concentration of SMX was determined by High-Performance Liquid Chromatography (HPLC, Waters 2695) coupled with a PDA UV detector (2998) and XBridhe™ C18 column (4.6 × 250 mm, 5 μm). The 1 wt% acetate: acetonitrile solution (60:40, v/v) was used as the mobile phase at a flow rate of 1 mL min^{-1} with column temperature of 30 ± 1.0 °C at 269 nm. The concentration of SMX was quantified according to the peak area detected by HPLC.

Text S2

The concentration of hydrogen peroxide was tested by titanium potassium oxalate colorimetric method [1]. 2 mL of water sample was taken, and 4 mL of 3 mol·L^{-1} H_2SO_4 and 4 mL of 0.05 mol·L-1 $K_2TiO(C_2O_4)_2$ were successively added, shaken well and left to stand for 10 min. The absorbance value was measured at 400 nm by ultraviolet spectrophotometer (DR5000, USA) and the standard curve was drawn. Further, in the PEF system with O_2 saturation, pH=3.0, and I=40mA, the mass concentration of H_2O_2 was obtained according to the standard curve without adding SMX.

The concentration of •OH in the solution was determined by the salicylic acid capture method, and the concentrations of hydroxylated products of 2,3-dihidroxy benzoic Acid (2,3-DHBA) and 2,5-dihydroxibenzoic Acid (2,5-DHBA) were analyzed by HPLC (Waters 2695) with a UV detector equipped with a WpH C-18 column (4.6 mm × 250 mm × 5 μm) [2]. The column temperature was set at 30 °C and the UV absorption was set at 320 nm. Methanol/water containing 0.5 vol.% acetic acid = 50/50 (V/V) was used as the mobile phase at a flow rate of 1.0 mL min-1. The injection volume was 20 μL and the total analysis time was 15 min. In the PEF system with O_2 saturation, pH=3.0 and I=40mA ,the standard plotted curves of 2,3 DHBA and 2,5 DHBA are drawn without adding SMX. Under the same conditions, 10 mmol L^{-1} salicylic acid (SA) was added to the electrolyte to capture •OH produced on the cathode surface, corresponding to the calibration of the reaction product, and the yield of •OH was estimated after the concentration was added.

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