Electrochemical Investigation of Phenol Oxidation by a TiO₂/GAC Based Packed-Bed Electrode Reactor

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In this work, TiO₂/GAC was prepared by sol-gel method and employed as particulate electrode for efficient phenol oxidation. The X-ray Diffraction (XRD) and X-ray photoelectron spectroscopy (XPS) analysis reveal the titanium dioxide loaded on GAC exists in anatase TiO₂ state. Compared to the GAC electrode, the TiO₂/GAC can enhance feedback current and catalytic-oxidation ability, which could be obtained through cyclic voltammetry (CV) and electrochemical impedance spectroscopy (EIS) measurements. Furthermore, the excellent electrochemical performance of TiO₂/GAC is validated by the increase of phenol and chemical oxygen demand (COD) removal and obvious decrease of the power consumption during bulk electrolysis of phenolic wastewater.

Keywords: phenol; TiO₂/GAC; packed-bed electrode reactor; catalytic-oxidation performance

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