Int. J. Electrochem. Sci., 12 **(2017)** 2777 – 2790

International Journal of
ELECTROCHEMICAL
SCIENCE
www.electrochemsci.org

Electrochemical Degradation of Phenol Wastewater by Sn-Sb-Ce Modified Granular Activated Carbon

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doi: 10.20964/2017.04.58

Received: 13 January 2017 / *Accepted:* 4 March 2017 / *Published:* 12 March 2017

Electrochemical degradation of phenol wastewater using Sn-Sb-Ce modified granular activated carbon (SCG) particle electrode was investigated. The electro-catalytic performance of different SCG electrodes were investigated by cyclic voltammetry (CV) and polarization plots. The scanning electron microscope accompanied with energy dispersive X-ray spectroscopy (SEM-EDS), X-ray diffraction (XRD) and Brunauer-Emmett-Teller (BET) were investigated in order to characterize the surface morphology of SCG particle electrode. The effects of volume flow rate, current density and initial pH value on removal of phenol and chemical oxygen demand (COD) were studied. Results demonstrated that at volume flow rate of 0.15 L min^{-1}, current density of 25mA cm^{-2} and initial pH value of 3, the optimal phenol and COD removal could reach 88.93% and 84.21%. Average current efficiency (ACE) and energy consumption (EC) were 16.25% and 0.2474 KWh $gCOD^{-1}$, respectively. These results demonstrated that SCG electrode would be a promising particle electrode for electrochemical degradation of phenol.

Keywords: Electrochemical degradation; particle electrode; phenol wastewater; three-dimensional electrode; COD removal

FULL TEXT