

Anodic oxidation of phenol using boron-doped diamond (BDD) electrode

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Electrochemical oxidation test of phenol was performed using boron-doped diamond (BDD) electrode as anode in a batch reactor. The effects of solution characteristics and process variables on removal efficiency were investigated such as initial concentration of phenol, initial pH, temperature and electrolyte concentration.

The electrochemical oxidation process using BDD electrode was effectively able to destruct phenol in water sample in a short period of time. The longer operation time was required to mineralize intermediates of phenol. The degradation kinetics of phenol varied from zero-order to first-order reaction as the initial concentration decreased. The initial pH, supporting electrolyte concentration and temperature did not influence the removal efficiency. The increase in the electrolyte concentration resulted in the reduction of energy consumption by enhancing the conductivity of the solution.