

Detection of Phenol and Chlorinated Phenols Using an Enzyme Electrode

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Phenol and chlorinated phenols are widespread in the environment and have been detected in atmospheric emissions from the combustion of municipal solid waste, coal, wood and herbicide. It is very toxic and the need of the detection as well as degradation tool of the chemicals is increasing. In this experiment, using an enzyme electrode, cyclic voltammetric and amperometric measurements were made to investigate the oxidation-reduction reaction of the chemicals and to examine the detection possibility of the chemicals. The enzyme electrode was prepared using a modified electrode body with tyrosinase (TYR), graphite powder, ferrocene-ormosil (Fc), and paraffin oil. The enzyme electrode performed reasonably to obtain the cyclic voltammograms of the chemicals. Most of peak currents were linearly correlated with the $(\text{scan rate})^{1/2}$ implying the diffusion limiting phenomena near the working electrode. From the voltammograms, the pairs of the redox peaks were obtained and the reversibility of the reactions was confirmed. Also from the amperometric measurements, the current step was investigated at a certain concentration range and the detection range was determined.