

Comparison of COD removal from petrochemical wastewater by electro-Fenton and electro oxidation processes: optimization and kinetic analyses

Vishal Kumar Sandhwar, Diksha Saxena, Shilpi Verma , Krishan Kishor Garg & Basheshwar Prasad

*Department of Chemical & Engineering
Parul University, Vadodara*

Abstract: This study reveals comparison between electro-Fenton (EF) and electro-oxidation (EO) methods to study chemical oxidation demand (COD) removal from synthetic petrochemical wastewater. Initially 54.60% of COD removal was found by acid precipitation treatment at optimum conditions. Subsequently, electrochemical treatments such as EF and EO using graphite electrodes were imposed to the supernatant and process parameters such as time (80 min), current density (60.97→121.95 A/m²), pH (2→6), Fe²⁺ concentration (1→2 mmole/L), electrolyte concentration (1→3g/L), and electrode gap (1→5 cm) were optimized by Box Behnken Design. Maximum removal of COD was obtained 66.23% and 56.57% with electric energy-consumption (kWh/kg CODremoved): 33.30 and 35.27 during EF and EO treatments respectively at optimum conditions.

Key words: COD removal, electro-oxidation, electro-Fenton, hydroxyl radical, Box Behnken Design

Link: <https://www.tandfonline.com/doi/full/10.1080/01496395.2020.1823414>