

TREATMENT OF PETROLEUM REFINERY SPENT CAUSTIC WASTES BY PEROX-ELECTROCOAGULATION

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ABSTRACT

In order to protect environment and to recover caustic soda solution, electrocoagulation and advanced oxidation (peroxy-electrocoagulation) technology was used to remove sulfide and organics from refinery sulfidic spent caustic wastes. The performance of peroxy-electrocoagulation on the conversion efficiency of sulfide and the removal of organic compounds was investigated. Several working parameters, such as solution pH, current density and electrode nature were studied in an attempt to achieve a higher removal capacity. The optimum electrocoagulation time, initial pH, current density and initial sulfidic spent caustic concentration were found to be 30 min, pH 9, 21.2 mAcm⁻² and 35000 mg L⁻¹, respectively. Under the optimum conditions established, conversion efficiency of sulfide to sulfate was greater than 80% and the removal capacity of organics expressed as COD was greater than 90%. The method was found to be highly efficient and relatively fast compared to conventional existing techniques.

Keywords: Petroleum refinery, sulfidic spent caustic, electrocoagulation, advanced oxidation.