FENTON AND PHOTO-FENTON OXIDATION
OF SULFIDIC SPENT CAUSTIC: A COMPARATIVE STUDY
BASED ON STATISTICAL ANALYSIS

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Abstract

This investigation compared the performance of Fenton and photo-Fenton oxidation processes in the treatment of sulfidic spent caustic wastewater. Response surface methodology, particularly central composite design was used to investigate the effect of Fe/H₂O₂ and H₂O₂/COD in assessing treatment process efficiency. Empirical models were developed to describe the relationship between the factors and responses. The models were validated through analysis of variance and were further used in process optimization. The best solution for Fenton process was found to be at Fe/H₂O₂ and H₂O₂/COD ratio of 0.07 and 2.52 correspondingly. On the other hand, lower H₂O₂/COD ratio of 1.84 was achieved in photo-Fenton process. Removal of COD and sulfide up to 97% and 100% was observed with photo-Fenton process.

Key words: Fenton oxidation, photo-Fenton oxidation, response surface methodology, sulfide oxidation, sulfidic spent caustic

Received: December, 2011; Revised final: June, 2012; Accepted: June, 2012

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