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High efficient treatment of the petrochemical phenolic effluent using spent catalyst: Experimental and Optimization

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Highlights

- Spent catalyst was applied in Fenton-like process.
- The catalyst showed high efficiency in phenol oxidation.
- Phenol concentration level in petrochemical effluent was reduced remarkably.
- Fenton-like effective parameters were optimized to access maximum phenol removal efficiency.

Abstract

Phenol is one of the dangerous volatile organic compounds (VOCs) which presents in almost every petrochemical plant's effluent. In this study, we regenerated spent catalyst of petrochemical styrene unit and applied to remove phenol from an industrial phenolic effluent in Fenton-like process. The catalyst was characterized using SEM, XRD, N_2 adsorption-desorption, EDX and XRF techniques. Effects of four important variables including H_2O_2 concentration, catalyst