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Comparison of Alkaline Treatment of Lead Contaminated Wastewater Using Lime and Sodium Hydroxide

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ABSTRACT

A lead-acid storage battery manufacturing industry in India produces several thousand liters of lead contaminated acidic wastewater on a daily basis and uses hydrated lime to render the lead-contaminated acidic wastewater alkaline (pH = 8.0). Alkaline treatment of the acidic wastewater with lime though a cost-effective method, generates copious amount of lead-contaminated gypsum sludge. Other alkali agents such as sodium hydroxide, sodium carbonate and dolomite are also used for alkali treatment of the acid wastewaters. The present paper compares the relative efficiency of hydrated lime and 0.05 M to 1 M NaOH solutions with re-spect to 1) amounts of sludge produced, 2) immobilization of the soluble lead in the acidic wastewater (AWW) and 3) increase in TDS (total dissolved solids) levels upon treatment of AWW with NaOH solutions and lime. The study also performs equilibrium speciation upon alkaline treatment of AWW with lime and NaOH (sodium hydroxide) solutions using the Visual MINTEQ program to understand the chemical reactions occurring during treatment process.

KEYWORDS

Acid, Alkali Agents, Alkaline Treatment, Battery, Lead, Speciation, TDS

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