

## Efinery Wastewater by Using Hydrogen Peroxide

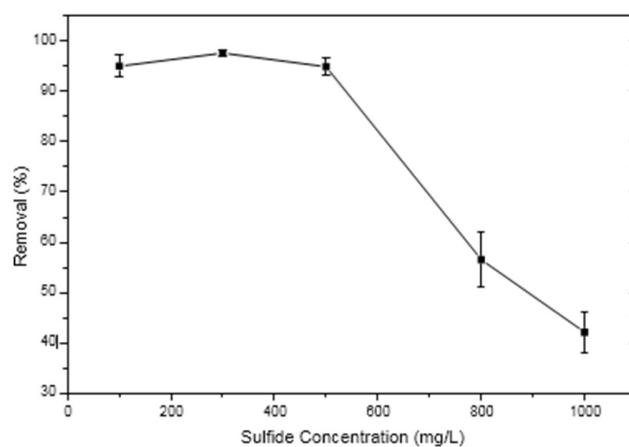
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### EXTENDED ABSTRACT

Petroleum refinery plants generate effluents, solid waste and sludge composed of organic, inorganic compounds including heavy metals. Spent Caustic or used caustic soda is a wastewater generated from the scrubbing process in the petroleum refinery industry. Further treatment is needed for petroleum refinery wastewater because it typically has high concentration of sulfide which is known as the most hazardous pollutants. Spent caustic is highly corrosive due to the high pH because it typically has pH more than 12 and sulfide concentration exceeding in 2-3 wt. %. It is released to environment as dissolved sulfide (S<sup>2-</sup> and HS<sup>-</sup>) in wastewater and H<sub>2</sub>S in waste gases. Thus, the removal of sulfide from petroleum refinery wastewater that can bring harmful to human and environmental problems because of their alkalinity and high sulfide level is very important. The effect caused by these hazardous pollutants and growing concern on environmental issues led to remove sulfide from petroleum refinery wastewater by using oxidation method in this study. The usage of strong oxidant in treating petroleum refinery wastewater is an effective method to remove sulfide. Therefore, chemical oxidation by using hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) to reduce sulfide concentration in petroleum refinery wastewater is investigated. In this study, effect of concentration sulfide simulated solution on sulfide removal which is one of parameters to determine. There are five portions of sulfide simulated solution with different concentration (100 mg/L, 300 mg/L, 500 mg/L, 800 mg/L and 1000 mg/L) of equal volume (200 ml). For each portion is treating by constant hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) dosage 1 ml. The experiments run for constant time of 30 min, constant temperature of 30 °C, constant agitation of 100 rpm and at a solution pH equal to 12. After treatment, its sulfide concentration, sulfate concentration and pH for each portions is analyzed. The effect of concentration sulfide simulated solution on sulfide removal is illustrated in Figure 1.



From Figure 1, shows the removal of sulfide which was 95.0 % , 97.6%, 94.9%, 56.5%, and 42.2% respectively was achieved when 100 mg/L, 300 mg/L, 500 mg/L, 800 mg/L and 1000 mg/L concentration of sulfide simulated solution was used. The highest percentage sulfide removal is 97.6% of 300 mg/L from sulfide simulated solution. Therefore, sulfate ) concentration increasing when H<sub>2</sub>O<sub>2</sub> is added and the diminution of sulfide concentration in treated samples.

Keywords: petroleum refinery wastewater; sulfide removal; oxidation method; hydrogen peroxide.