

Petpailin Suwanatat 2006: Improvement of Fluoride Removal for Wastewater Treatment Process of Tantalum Refinery. Master of Engineering (Environmental Engineering), Major Field Environmental Engineering, Department of Environmental Engineering. Thesis Advisor: Assistant Professor Utchara Duangdeun, M.Sc. 109 pages.  
ISBN 974-16-2828-5

This research is aimed to improve fluoride removal for wastewater treatment process of tantalum refinery. The methodology that used to improve fluoride removal for this research was precipitation by calcium hydroxide. This method was suitable and widely accepted for treatment of wastewater that contains high level of fluoride. The experiment was divided into two parts. The first part was to find suitable condition to reduce the range of fluoride such as speed and time of slow mixing, range of pH in wastewater and quantity of calcium hydroxide that was suitable to remove fluoride from wastewater. This experiment used synthetic wastewater prepared with three different fluoride concentrations, which were 1,000; 5,000 and 10,000 mg/l. The second part of the experiment was to apply the results of suitable conditions from the first experiment to the real wastewater of tantalum refinery. The real wastewater was treated with 2 different methods. The first one was to remove fluoride from wastewater by dissolving calcium hydroxide in the water. Another one was to use wastewater with low range of fluoride in stead of tap water in preparation process of dissolving calcium hydroxide. This was used only to remove fluoride from wastewater with the level of fluoride concentration at 10,100 mg/l.

The result of the first experiment illustrate that the suitable speed of slow mixing was 40 rounds per minute, suitable time of slow mixing was 60 minutes. The ranges of pH were between 4-9. The suitable quantity for calcium hydroxide to remove wastewater with fluoride at different concentration level 1,000; 5,000 and 10,000 mg/l were 15; 15 and 20 g/l, or 66.31; 331.33 and 497.03 mg F/g  $\text{Ca}(\text{OH})_2$  respectively. For the first part of the second experiment, the suitable quantity for calcium hydroxide to treat real wastewater contain fluoride at 1,010; 5,229 and 10,100 mg/l were 15; 20 and 30 g/l, or 66.07; 259.09 and 334.62 mg F/g  $\text{Ca}(\text{OH})_2$  respectively. Part two of the experiment found that the suitable quantity of calcium hydroxide for removing fluoride from wastewater with the level of fluoride concentration at 10,100 mg/l was 50 g/l, or 199.23 mg F/g  $\text{Ca}(\text{OH})_2$ . The removal efficiency of the two parts exceeded more than 98.00%, the effluents were still not reach the effluent standard of 5 mg/l set by Industrial Estate Authority of Thailand. Therefore it was necessary to follow up with Alum precipitation.

Petpailin Suwanatat

Student's signature

Utchara Duangdeun

Thesis Advisor's signature

29 / 10 / 49