

Thesis Title	Removal of Sulfur Content in Lignite by Chemical Extraction
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### Abstract

Sulfur is a constituent in coal and it causes air pollution after combustion. This thesis, studies suitable concentration and temperature conditions for removing sulfur in lignite using chemical extraction technique. The operation cost in chemical extraction also calculated. Three chemicals were chosen to extract sulfur: sodiumcarbonate, copper(II)chloride and potassiumpermanganate solutions. The mixing ratio of chemical solution and lignite was 500 ml:100 g. The mixing rate was kept constant at 150 rpm and the operation time was 1 hour. The concentration of chemical solution and temperature were varied as specified in the experiment. The lignite samples were retrieved from Mae Moh mine, Lampang.

The experimental results show that the suitable conditions in removing sulfur in Mae Moh lignite, starting from the higher performance was as follows: 0.1 M sodiumcarbonate solution operating at 100 °C; copper(II)chloride solution 20% w/v at 150 °C, and potassiumpermanganate solution 10% w/v at room temperature. The removal efficiency of sulfur is 59% , 51% and 71%, respectively. The suitable condition found to depend on the property of solution, chemical reaction between the solution and sulfur in lignite, concentration of extracted chemicals and temperature. The operation cost which includes the cost of chemical and electricity was also calculated. Copper(II)chloride has the highest cost of 70.85 bahts per gram sulfurdioxide removed. Potassiumpermanganate

costs 14.8 bahts and sodiumcarbonate provides the lowest cost of 4.51 bahts per gram sulfurdioxide removed.

By comparing the removal efficiency and the operation cost of the three chemicals used, it can be concluded that, potassiumpermanganate solution is the most favorable chemical used in the experiment. It yields higher removal efficiency and the lower operation cost.

Keywords: Sulfur/ Lignite/ Chemical Extraction/ Sodiumcarbonate Solution/  
Copper(II)chloride Solution/ Potassiumpermanganate Solution