

NITTAYA BOONTIAN : CHEMICAL INVENTORY AND INVESTIGATION
OF TREATMENT METHODS FOR CHEMICAL SUBSTANCES USED AT
SURANAREE UNIVERSITY OF TECHNOLOGY

THESIS ADVISOR : ASSIST. PROF. CHONGCHIN POLPRASERT, Ph.D.
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This study investigates the approach that could improve the chemical wastes treatment and management at Suranaree University of Technology (SUT). The first part of this thesis consists of a development of chemical inventory and consideration of chemical quantity used in laboratories. In the second part, precipitation and adsorption methods were used to treat selected chemical wastes that are among the most-used chemicals at SUT. The methodology of the treatment method investigation for laboratory waste consists of two steps; inorganic substances removal by precipitation, and organic substances removal by adsorption. Inorganic substances used in studying the precipitation are copper and zinc with concentrations of 40 and 10 mg/L, respectively. In the precipitation experiments, the suitable pH was 8. The use of alum or ferric chloride after lime addition did not result in an improvement of Cu and Zn removal efficiency.

In the adsorption experiment, acetic acid and ethyl acetate were two organic substances studied, using carbon (coconut shell based granular activated carbon grade : DEO 8/30) as an adsorbent. With the Freundlich isotherm equation, it was found that log K_f values of acetic acid and ethyl acetate values were -2.00 and -1.14 , and $1/n$ values were 1.27 and 1.25 , respectively. The granular carbon was found to adsorb ethyl acetate better than acetic acid. Since ethyl acetate has large plain area in contact with activated carbon surface, van der Waals force is stronger than acetic acid.

In designing organic removal system, fixed-bed adsorption column experiments were conducted. Continuous treatment of synthetic wastewater containing 0.10 moles/L of acetic acid and 0.14 moles/L of ethyl acetate, with a 400 g granular carbon showed that these organic substances could pass through the column for $1,000$ mL and $9,000$ mL of the influents, respectively, before the breakthrough concentration was observed.

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