

## C717961 : MAJOR ENVIRONMENTAL ENGINEERING

KEY WORD: HEAVY METAL / METAL OXIDES / ADSORPTION / ION EXCHANGE  
PHANACHIT DHANASIN : TREATMENT OF ZINC AND NICKEL IN  
SYNTHETIC WASTEWATER BY IRON AND MANGANESE OXIDE  
COATED-SAND. THESIS ADVISOR : ASSIST. PROF. PETCHPORN  
CHAWAKITCHAROEN, Ph.D. THESIS COADVISOR : ASSIST. PROF.  
PRASANG MONGKOLSIRI, Ph.D. 222 pp. ISBN 974-635-723-9

This research studied about the efficiency and the suitable pH of Zinc and Nickel synthetic wastewater treatment by iron and manganese oxide coated-sand. The experiment was divided into 2 steps, the first step was carried out in order to find the suitable pH and ion exchange capacity of two medias with synthetic wastewater concentration 10 mg/l, 20 mg/l and 50 mg/l at pH 5, 6, 7 and 8 respectively. The second step was about the comparison of quantity of metal in a regenerant between sodium nitrate 0.01 M and 0.1 M by using the optimum condition from the first step.

The results from the first step show that the best efficiency for Zinc and Nickel exchange of iron and manganese oxide coated-sand was at concentration of 50 mg/l and at pH 6. For iron oxide coated-sand, the efficiency for Zinc and Nickel exchange was equal to 68.92 % and 69.52 % which correspond to the quantity of exchangable Zinc and Nickel equal to 1978.02 mg/l.resin and 2136.33 mg/l.resin. For manganese oxide coated-sand, the efficiency for Zinc and Nickel exchange was equal to 60.66 % and 68.27 % which correspond to the exchangable Zinc and Nickel equal to 2982.64 mg/l.resin and 3057.52 mg/l.resin.

The result in the secondary step reveals that the regeneration of two medias with sodium nitrate 0.1 M can recovered more metal than sodium nitrate 0.01 M. In case of iron oxide coated-sand, sodium nitrate 0.1 M recovered more metal than sodium nitrate 0.01 M about 2-4 times. This ratio was increased up to 12 times for manganese oxide coated-sand considering in the same volume of sodium nitrate.

ภาควิชา วิศวกรรมสิ่งแวดล้อม  
สาขาวิชา วิศวกรรมสิ่งแวดล้อม  
ปีการศึกษา ๒๕๖๕

ลายมือชื่อนิสิต ทอเกียรติ งาม  
ลายมือชื่ออาจารย์ที่ปรึกษา ธีรพร งาม  
ลายมือชื่ออาจารย์ที่ปรึกษาร่วม ประภาว งาม