

KEY WORD: ION EXCHANGE RESIN / PLATING / NICKEL

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WASTE WATER USING AN ION EXCHANGE RESIN . THESIS ADVISOR
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This thesis involve the study of Nickel recovery from the Nickel electroplating process during final rinsing stage. The research consists of 2 parts. First is the comparison of Nickel Ion exchange capacity, and an efficiency of Nickel recovery between normal type of cation resin with sulfonic acid functional group and special type of cation resin with Imminodiacetic acid functional group. Synthetic liquic which contains only Nickel concentration of 200 and 300 mg/l, and artificial waste water contains other unchanged ions and Nickel concentration of 200 and 300 mg/l are used this step of experimental. Second experimental is to study the optimum conditions and value study of parameters in order to have the maximum recovery during the step of regeneration of the first experimental resin. The acid amount to be introduced for regeneration is varied from 3, 4.5 and 6 BV/hour, and within each rate of introduced acid the acid concentration of 3, 5, 7, 9 and 12% by weight are applied.

The first experiment have shown that the special type of resin have better performance of Nickel ion exchange, and higher efficiently of Nickel recovery than normal type resin for every concentration of Nickel and any synthetic waste water. For example, for the synthetic waste water with Nickel concentration of 300 mg/l Nickel can be exchanged about 73,909 mg/litter of resin Equal to total capacity 2.51 eq. Ni^{2+} /l.resin, and Nickel recovery during regeneration with 4.5 BV/hr of 3% acid is 72,772 mg/litter of resin for the special type of resin. This is equal to 98% recovery while the normal type of resin at the same condition can exchange Nickel ion only 66,553 mg/litter of resin, equal to total eapacity 1.16 eq. Ni^{2+} /l.resin and recover Nickel about 52,274 mg/l.resin which is 78.5% recovery

In second experiment, the special type of resin was utilized, and optimum parameters value for maximum recovery of Nickel are found. The best concentration of sulfuric acid to be used to get Nickel amount of 80,800 mg/l is 9% by weight at the acid rate of 4.5 BV/hr. At this concentration of sulfuric acid, the maximum bickel concentration of 25,937 mg/l with the acid rate of 2.63 BV is achieved and recovery efficiency comparision of used level regenerant is 45.2%

Finally, actual waste water from a electroplating factory was brought to the experimental It can be recovered only 58,065 mg/l.resin at the maximum concentration of 19,359 mg/l for the acid rate of 2.25 BV