

Nakorn Srithiwong 2006: Removal of Cadmium Ions (II) in Aqueous Solution
by Using Iron Oxide from Rolling Mill Scale as Adsorbent. Master of Engineering
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Environmental Engineering. Thesis Advisor: Mr. Pipat Pooripanyakun, M.Eng. 144 pages.
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The objective of this research was to study the efficiency of Cadmium Ions (II) removal in aqueous solutions by using Iron oxide from rolling mill scale as adsorbent. The experiment involved two processes: the batch experiment and the continuous experiment. In the batch experiment, the influence of pH and contact time for equilibrium on removal capability were considered. The continuous experiment used Iron oxide column which Cadmium Ions (II) concentration in synthetic wastewater was 2.8 mg/L and filtration was $0.3 \text{ m}^3/\text{m}^2 \cdot \text{h}$. The efficiency removal of Cadmium Ions (II) was studied, using the service time calculated the adsorptive capacity and the rate constant by Bohart and Adams equation. Cadmium Ions (II) concentration after adsorption from Iron oxide column at the depth 20, 50 and 80 cm. respectively was not more than 0.03 mg/L which allowed by the effluent of Thai Industrial standard and Industrial Estate Authority of Thailand (IEAT) standard.

The results indicated that in batch experiment, the removal efficiency (72%) had been achieved at optimum conditions of pH 9.0 and contact time 36 h. In continuous experiment, the maximum removal efficiency was found to be 98.61% at the depth 80 cm. and service time to breakthrough point was 66 hours and the quantity of wastewater met the standard 50.36 L. and the maximum adsorption of Cadmium Ions (II) (X/M) 0.0174 mg/g. With the calculation according to Bohart and Adams equation, the adsorptive capacity was 55.44 mg/L (N_0), the rate constant was 0.15 L/mg-h (K) and Iron oxide adsorption capacity 0.022 mg/g. From the research study, the continuous Iron oxide column had been found at the depth 80 cm at optimum condition to be best efficiency removal of Cadmium Ions (II) (98.61 %) and the effective cost of synthetic wastewater was 171 baht/ m^3 and 7 baht/gram of Cadmium.

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Thesis Advisor's signature

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