Nirawat Nitchawat 2014: Treatment of Vinyl Acetate Monomer in Synthetic Wastewater by Activated Carbon Adsorption Process. Master of Engineering (Environmental Engineering), Major Field: Environmental Engineering, Department of Environmental Engineering. Thesis Advisor: Assistant Professor Mongkol Damrongsri, Dr.Ing. 87 pages.

The objective of this research is to study treatment of Vinyl Acetate Monomer (VAM) in synthetic wastewater by activated carbon adsorption process. Granular activated carbon and VAM concentration in synthetic wastewater of 1,000 mg/l were used in experiment. Adsorption equilibrium, Langmuir and Freundlich adsorption isotherms and continuous run of adsorption column at activated carbon bed depth of 0.3, 0.6, 0.9 and 1.2 m and hydraulic loading rate of 0.4774, 0.9548 and 1.4322 m^3/m^2.h were investigated.

The results showed that time of contact to approach adsorption equilibrium of VAM was 1 h and adsorption isotherm could be described by Freundlich adsorption isotherm (R^2= 0.9948) and equation was $x/m = 0.1564C_e^{1.0953}$. The adsorption capacity was 24.26 mg VAM/g GAC (at 90% removal, C_e = 100 mg/l). At breakthrough of continuous run of adsorption column showed that treatment efficiency, service time and volume of wastewater treated at breakthrough decrease by an increase in hydraulic loading rate and a decrease in bed depth. Kinetic coefficients of Bohart-Adams equation at hydraulic loading rate of 0.4774, 0.9548 and 1.4322 m^3/m^2.h were 14.7540, 14.0755 and 13.7724 kg/m^3 for adsorption capacity (N_0), 1.9692, 2.1661 and 2.2103 m^3/kg.h for rate constant (K), 0.0361, 0.0688 and 0.1034 m for critical depth (D_0), respectively. The result indicated that an increase in hydraulic loading rate lead to a decreasing trend of N_0, an increasing trend of K and D_0. These kinetic coefficients could be used for full-scale adsorption system design for wastewater treatment.

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