Part I- Oxygen Depletion Kinetics



Figure 1. Dissolved oxygen rate (data set 1) with a second-order reaction (n=2). For this model

k= .14 L/mg-min.



Figure 2. Dissolved oxygen rate (data set 2) with a zero-order reaction (n=0). For this model

k= 0.3 mg/L-min.



Figure 3. Dissolved oxygen rate (data set 3) with a first-order reaction (n=1). For this model

k= 0.11 1/min.

**MEMORANDUM**

**Date:** September 24, 2013

**To:** Professor Sills

**From:** Ms. Dajah Massey, Student

**Subject:** Part II- Sorption

**Objective**

The objective of this lab was to analyze data to determine a fit to the sorption of isotherms of chlordane on granulated activated carbon (GAC).

**Methods**

A Kaleidagraph program was used to fit the data set in the two isotherm models- linear and Freundlich.  The data was first fit to linear using equation 1, in the appendix.  Next the data was fit to Freundlich using equation 2, in the appendix.  For both equations the q= mass of absorbate absorbed per mass of absorbent at equilibrium (mg/g), C= concentration of absorbate in the aqueous phase at equilibrium (mg/L), K=Freundlich isotherm solid water partition coefficient (L/g), and 1/n = Freundlich isotherm intensity parameter (unitless).

**Results and Discussion**

Out of linear fit and Freundlich fit the data best fit the Freundlich model as seen in Figure 4 in the appendix. Fraundlich model was chosen based on a visual assessment of Figure 4 instead of a statistical test for good fit. It is clearly the most appropriate for the collected data.

**Appendix**

(1) Equation 1: Linear sorption isotherm

(2) Equation 2: Freundlich sorption isotherm



Figure 4. The concentration change of the aqueous absorbate compared to the absorbed concentration on granulated activated carbon. A Freundlich model fit was applied with a 1/n=0.4 and K=245 L/g.