LIST OF SYMBOLS USED

$q_e$ amount of solute removed per unit mass of adsorbent, mg/g
$x$ amount of solute removed, mg/L
$m$ adsorbent concentration, g/L
$K_F$ and $n$ Freundlich constants
$K_L$ and $b$ Langmuir constants
$q_m$ Langmuir monolayer adsorption capacity
$C_e$ equilibrium solute concentration, mg/L
$C_i$ initial concentration of adsorbate solution, mg/L
$\beta$, $b_R$ and $K_R$ Redlich- Peterson constants
$pH_{ZPC}$ pH of zero point charge
$R_L$ separation factor
$k_2$ pseudo- second order rate constant, g mg$^{-1}$min$^{-1}$
$q_{e(t)}$ amount adsorbed at equilibrium as predicted by the pseudo- second order model
$q_t$ amount of solute adsorbed at time $t$
$t$ contact time, min
$h$ initial sorption rate, mg g$^{-1}$ min$^{-1}$
$k_1$ pseudo-first order rate constant (min$^{-1}$)
$q_{e(t)}$ amount adsorbed at equilibrium as predicted by the pseudo- first order model
$K_C$ equilibrium constant for the distribution of solutes between solid and liquid phases
$T$ absolute temperature
$R$ gas constant
$\Delta S$ entropy change, JK$^{-1}$mol$^{-1}$
$\Delta H$ enthalpy change, KJmol$^{-1}$
$\Delta G$ free energy change, KJmol$^{-1}$