# Exercise (model answer)

Q1. Phenol will be removed by adsorption to activated carbon A. The initial concentration of phenol is 9.0 mg L^{-1}. The adsorption of phenol to activated carbon A is described by the Freundlich equation $q = 100\,C^{0.45}$ where q = adsorbed mass (mg g-AC^{-1}), C = equilibrium concentration (mg L^{-1}). 4pt

(1) Draw a rough sketch (graph) of the adsorbed mass of phenol versus its equilibrium concentration. Specify the meaning of axis and its unit. 2pt
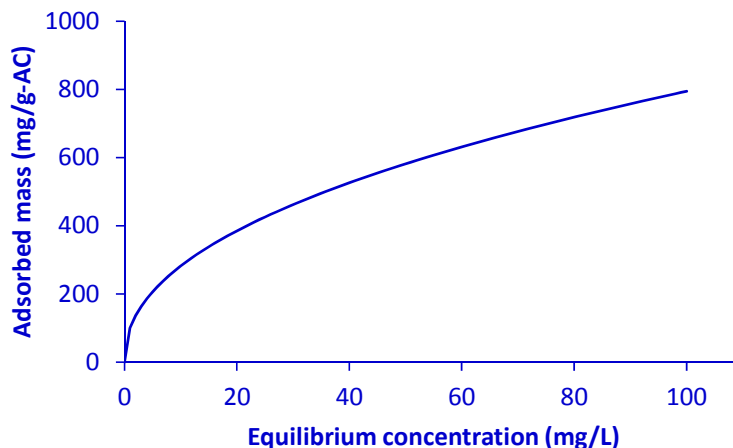
(2) Determine how much activated carbon A (g L^{-1}) is required to reduce phenol concentration less than 1.0 mg L^{-1}. 2pt

$(9.0-1.0) / x = 100 * 1.0^{0.45}$

x = <u>0.080 g/L</u>

Q2. Suppose that the suspended solid concentration in a lake A is 200 mg L^{-1} and the partition coefficient for sorption is 100 L kg^{-1} for atrazine. Calculate the fraction of atrazine that is in the dissolved phase. 4pt

Volume of water containing 1 kg of suspended sediment is

$1 / 200$ (mg L^{-1}) = 5,000 (L kg^{-1})

If concentration of dissolved atrazine is A mg L^{-1}, atrazine concentration in solid phase is

100 (L kg^{-1}) x A (mg L^{-1}) /5000 (L kg^{-1}) = 0.02A (mg L^{-1})

Therefore, the fraction of the dissolved atrazine is

f_d = A / (A + 0.02A) = 0.98

∴ <u>98%</u> atrazine is dissolved in water column.

Q3. Write one question related to today's lecture. 2pt

Any question is acceptable as long as it's related to the content of the class.