Quantitative equilibrium calculations

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Retardation factor of chlorobenzene and 1,3,5trichlorobenzene

Calculate the retardation factor, R_{f_i} , of chlorobenzene and 1,3,5-trichlorobenzene (1,3,5-TCB) in an aquifer at 10°C. (Note that the retardation factor is identical to the inverse fraction of compound in the mobile phase $R_{f_i} = f_{iw}^{-1}$ if sorption equilibrium is attained; see Box 13 in the textbook).

Assume that retardation is determined by absorption to the aquifer solids' POM. The average organic carbon content of the aquifer material is 1.1 % ($f_{oc} = 0.011$). The minerals can be assumed to have a density of 2.5 kg L⁻¹ and the porosity is 0.33. Sorption coefficents at 10°C:

a) chlorobenzene: $K_{ioc} = 160 L kg_{oc}^{-1}$

b) 1,3,5-TCB: K_{ioc} =1780 L kg_{oc}⁻¹

- Answer:
- a) 10
- b) 100
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- Excercises for an improved intuitive understanding
- Questions for recapitulation
- Good to know
- Minesweeper-problems