Humic Substances as Complexing Agents for Metals (section 13.2.3; textbook)

Many possible complexation sites on humic substances:

In natural systems, the extent of complexation depends on a number of factors;

1. the nature of the metal ion*

2. nature of humic material

3. pH of the solution

4. ionic strength of the solution

Conditional Formation Constants (K_f') at pH 5 for standardized fulvic acid.

Metal ion	**K_f'**
Mg^{2+}	1.4×10^2
Ca^{2+}	1.2×10^3
Mn^{2+}	5.0×10^3
Co^{2+}	1.4×10^4
Ni^{2+}	1.6×10^4
Cu^{2+}	1.0×10^4
Zn^{2+}	4.0×10^3
Pb^{2+}	1.1×10^4

Consider a water sample containing 85 μg/L of Ni and 8 mg/L DOM in the form of fulvic acid. Calculate the concentration of complexed ([Ni-FA]) and uncomplexed ($[Ni]_{free}$)nickel ion. Use a typical concentration of carboxylates for fulvic acids of C_{CO2}- = 5 mmol/g.