Absorbance Spectrum

A) Position. Expressed in wavelength (nm usually) or frequency (Hz, usually) or wavenumbers--also called cm\(^{-1}\).

Remember, E = h\(\nu\) and \(c = \nu\lambda\)

\[\nu = \frac{c}{\lambda}\] and \[\frac{\nu}{c} = \frac{1}{\lambda}\]

B) Intensity. Expressed in unitless absorbance "units", it is proportional to concentration, path length and molecular absorbance by the Beer's law relationship:

\[A = \varepsilon cl\]

where A is absorbance, \(\varepsilon\) is the extinction coefficient (molecular absorbance), c is the concentration (in convenient units, but \(\varepsilon\) must be in the same units) and l is the pathlength.

Transmittance Spectra

Transmittance spectra do not give peaks that are proportional to concentration or extinction coefficient in a simple linear way.