Question #48955, Chemistry, Inorganic Chemistry

Question:

Compound X exhibits molar extinction coefficient of 245 m2mol at 450 nm. What concentration of X in a solution will cause a 25% decrease in the intensity of 450 nin radiation when the solution is placed in a 0.01 m absorption cell ?

Answer:

The Beer-Lambert Law states:

$A = \varepsilon Cl$, where $A = -\ln(I/I_0)$. We have that $I/I_0 = 0{,}75$, therefore:

$$-\ln(0.75) = 245 \times C \times 0.01 \Rightarrow C = 0.12 mol / m^3$$