

What is the concentration of a dye molecule that has $\epsilon(600 \text{ nm}) = 74,000 \text{ M}^{-1}\text{cm}^{-1}$ if it has an absorbance of 0.6 at 600 nm in a 1 cm pathlength cell? What fraction of the incident light makes it through the cuvette?

Solution:

- $A = \epsilon \cdot d \cdot c$
- $\epsilon = 74,000 \text{ M}^{-1} \text{ cm}^{-1}$, $d = 1.0 \text{ cm}$, $A = 0.6$
- $c = A/(d \cdot \epsilon) = 0.6/(74,000 \text{ M}^{-1} \text{ cm}^{-1} \cdot 1.0 \text{ cm}) = 8 \cdot 10^{-6} \text{ M}$
- $I/I_0 = 10^{-A} = 0.25$ or 25%