

What is the concentration of a dye molecule that has $\epsilon(540 \text{ nm}) = 65,000 \text{ M}^{-1}\text{cm}^{-1}$ if it has a transmittance of 50% at 540 nm in a 1 cm pathlength cell? What is the absorbance of the sample?

Solution:

- $A = -\log_{10}(\%T/100) = -\log_{10}(0.5) = 0.3$
- $A = \epsilon \cdot d \cdot c$
- $\epsilon = 65,000 \text{ M}^{-1} \text{ cm}^{-1}$, $d = 1.0 \text{ cm}$
- $c = A/(d \cdot \epsilon) = 0.3/(65,000 \text{ M}^{-1} \text{ cm}^{-1} \cdot 1.0 \text{ cm}) = 4.6 \times 10^{-6} \text{ M}$

Concentration of dye = _____.

Absorbance = _____.