Rhodamine dye jet concentration

Rhodamine is a laser dye. To get the laser to run you need an absorbance of 0.5 in a jet that is 100 microns thick. For Rhodamine ϵ = 55,000 $M^{-1}cm^{-1}$ at 560 nm. What concentration of Rhodamine is required?

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Solution:

1. Use Beer's law,

$$A = \varepsilon c \ell$$

Determine which quantity is the unknown and solve for it. Here we know everything except the concentration, c.

$$c = \frac{A}{\varepsilon \ell} = \frac{0.5}{(55{,}000\ M^{-1}cm^{-1})(10^{-2}\ cm)} = 0.0009\ M$$