

54. According to Sample Problem 41-6, $N_x/N_0 = 1.3 \times 10^{-38}$. Let the number of moles of the lasing material needed be n ; then $N_0 = nN_A$, where N_A is the Avogadro constant. Also $N_x = 10$. We solve for n :

$$n = \frac{N_x}{(1.3 \times 10^{-38}) N_A} = \frac{10}{(1.3 \times 10^{-38})(6.02 \times 10^{23})} = 1.3 \times 10^{15} \text{ mol} .$$