

P2

at 1000C the diffusion coefficient is $2 \times 10^{-14} \text{ cm}^2/\text{s}$

(from table
table 8, slide 17)

the constant surface concentration is $C_s = 4 \times 10^{22} \text{ at/cm}^3$

a) $C(x,t) = C_s \operatorname{erfc}\left(\frac{x}{2\sqrt{Dt}}\right)$

using the values we obtain $\frac{x}{2\sqrt{Dt}} = 1,7 \rightarrow \operatorname{erf}(1,7) = 0,9838$

$\Rightarrow \operatorname{erfc}(1,7) = 1 - 0,9838 = 0,0162 \rightarrow C(x,t) = 4 \times 10^{22} \times 0,0162$
 $C(x,t) = 6,48 \times 10^{20} \text{ at/cm}^3$

b) at 1200C $D_{\text{plust}} = 1 \times 10^{-12} \text{ cm}^2/\text{s}$

so $\frac{x}{2\sqrt{Dt}} = 0,17 \rightarrow \operatorname{erf}(0,17) \approx 0,19 \rightarrow \operatorname{erfc} = 0,81$

$\Rightarrow C(x,t) = 4 \times 10^{22} \times 0,81 = 3,24 \times 10^{22} \text{ at/cm}^3$

P3

We know $C(x,t) = C_s \operatorname{erfc}\left(\frac{x}{2\sqrt{Dt}}\right) \Rightarrow \frac{10^{22}}{10^{24}} = \operatorname{erfc}\left(\frac{x}{2\sqrt{Dt}}\right) \Rightarrow$

$\Rightarrow 0,01 = 1 - \operatorname{erf}\left(\frac{x}{2\sqrt{Dt}}\right) \Rightarrow \operatorname{erf}\left(\frac{x}{2\sqrt{Dt}}\right) = 0,99$

By looking at the erf table we find $z = 1,9$

So $\frac{x}{2\sqrt{Dt}} = 1,9 \Rightarrow x = 1,9 \times 2 \times \sqrt{Dt} = 3,32 \times 10^{-2} \text{ cm}$