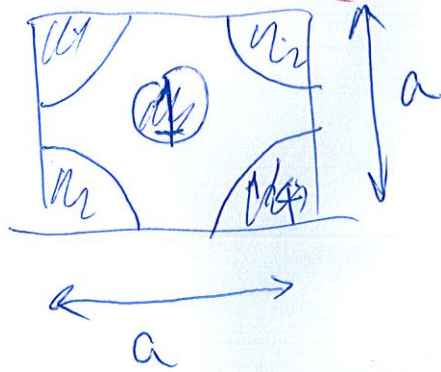


2.2

Concentration $\left(\frac{\#}{\text{cm}^3} \right)$ - volume
 $\left(\frac{\#}{\text{cm}^2} \right)$ - areal



$m. a \leftarrow 2 \text{ atoms}$

$$\frac{2 \text{ atoms}}{(5.43 \times 10^{-8} \text{ cm})^2} \rightarrow \#$$

$$\text{sum}(400) = 6.8 \times 10^{14} \frac{\text{Si atoms}}{\text{cm}^2}$$

4 atoms/fcc

host: $\text{fcc1} + \text{fcc2} = 8 \text{ Si atoms.}$

$$\frac{8}{(5.43 \times 10^{-8} \text{ cm})^3} \rightarrow 5 \times 10^{22} \frac{\text{Si atoms}}{\text{cm}^3}$$

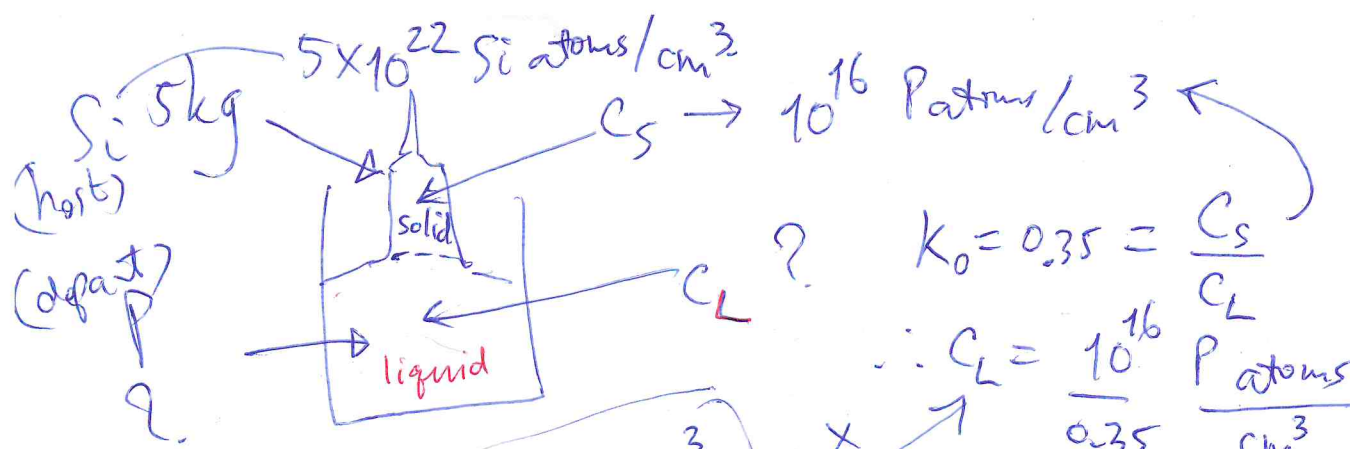
dope impurity

$$\frac{1 \text{ part}}{10^6 \text{ parts}} \times 5 \times 10^{22} \frac{\text{impurity atoms}}{\text{cm}^3} \rightarrow 5 \times 10^{16} \frac{\text{impurity atoms}}{\text{cm}^3}$$

2.3 Density (g/cm^3)

Si: $\frac{5 \times 10^{22} \text{ atoms Si}}{6.02 \times 10^{23} \text{ cm}^3} \times \frac{\text{mol}}{\text{atoms}} \times 28.1 \text{ (g)} = 2.33 \text{ g/cm}^3$

GaAs: $\frac{\text{fcc1 Ga} + \text{fcc2 As}}{6.02 \times 10^{23} (5.65 \times 10^{-8} \text{ cm})^3} \times \frac{\text{atoms mol}}{\text{atoms}} \times (4 \times 69.7 + 4 \times 74.9) \text{ (g)} = 5.33 \text{ g/cm}^3$



Host Si $\frac{5000 \text{ g cm}^3}{2.33 \text{ g}}$

Host + dopant vol. =

∴ requires $\left[\frac{5000 \text{ cm}^3}{2.33} \times \frac{10^{16} \text{ P atoms}}{0.35 \text{ cm}^3} \right] \times \frac{\text{mol}}{6.02 \times 10^{23} \text{ atoms}} \times \frac{31 \text{ g}}{\text{mol}}$

∴ 3.2 mg

RA