KEY FORMULAS

ABSORPTION

Linear absorption coefficient μ

$$\mu = \rho \sum_j \frac{P_j}{100} \left(\frac{\mu}{\rho} \right)_j , \mathrm{E}_j$$

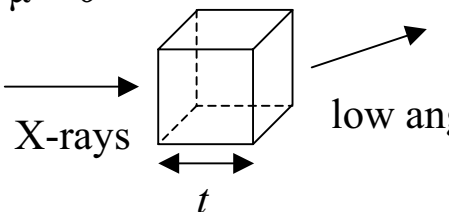
for the n elements E, each constituting P_j % of the crystal.

What is (μ/ρ) for graphite? diamond?

$$I = I_o \, e^{-\mu t}$$

$I \propto$ #electrons $\propto$ volume of crystal

gives I_o if $\mu = 0$



low angle reflection path through crystal $\approx t$

cube crystal

$I \propto$ Volume $= t^3$ $\qquad$ $I = I_o \, e^{-\mu t}$

$I \propto t^3 e^{-\mu t}$ $\qquad$ When is $dI/dt = 0$?

Maximum I when $t = 3/\mu$ - more conservative to pick $t \leq 1/\mu$

UNIT CELL MASS

$$M = 0.60226 \, V \rho, \; V \text{ in } \text{Å}^3$$

Unit cell mass = z (F.W.) [z is # formula units/cell]

$$\frac{M}{V} = \rho \qquad M = \text{mass of A} = \frac{z \, (\text{FW})}{6.02 \times 10^{23}}$$

$$\text{Vol Å}^3 = \text{Vol. cm}^3/10^{24}$$