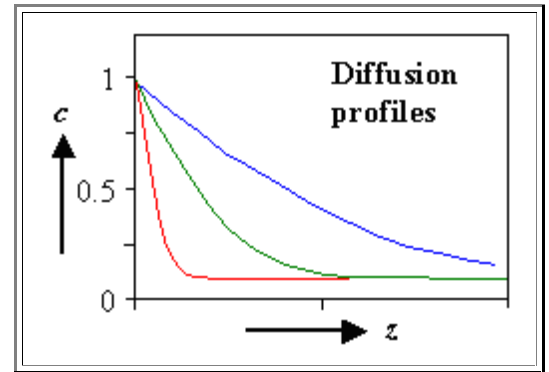


3.3.2 Essentials to Chapter 3.3 Experimental Approaches to Diffusion Phenomena

It's easy in principle: You produce and measure a diffusion profile.

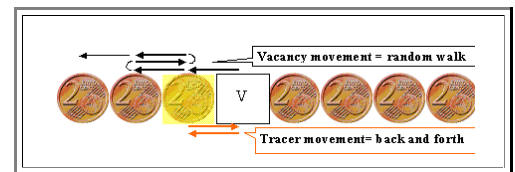
- Put whatever is supposed to diffuse on the crystal surface (make sure you cope properly with the "dirt" or oxide on the surface).
- Let it diffuse at a defined T for a defined time t .
- Measure the diffusion profile "somehow".
- Fit to a solution of Fick's law = one data point for $D(T)$.
- Repeat at different temperatures until you gave enough data points for an (Arrhenius) $D(T)$ plot.



Use isotopes of the material in question for self-diffusion measurements.

While the intrinsic point defect serving as diffusion vehicle will do a perfectly random walk, the diffusing atom may *not*.

- There is a correlation coefficient f linking measured and theoretical diffusion coefficients.



$$D_{SD}(T) = f_{1V} \cdot D_{SD}(\text{Theo})$$

- The correlation coefficient f is = **0** for **1dim.** diffusion, around **1/2 - 2/3** for **2dim.** diffusion (e.g. in the base plane of hexagonal lattices) and around **2/3 - 3/4** for **3dim.** diffusion.

There are many other ways to obtain diffusion data, none fool-proof and all money and/or time expensive.