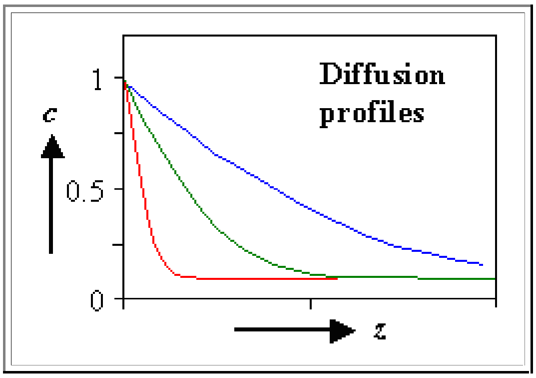
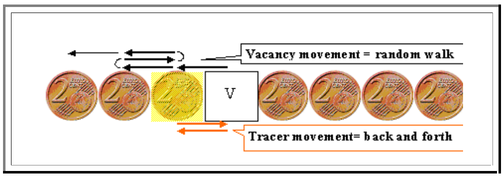
3.3.2 Essentials to Chapter 3.3 Experimental Approaches to Diffusion Phenomena

- 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.