

## Diffusion Coefficients

### Low Molecular Weight Gases

- a)  $D_{is} \approx 10^{-1} \text{ cm}^2/\text{s}$  ( $10^{-5} \text{ m}^2/\text{s}$ )
- b)  $D_{is} \propto T^{3/2}$  (Absolute temperature)
- c)  $D_{is} \propto 1/P$
- d)  $D_{is}$  is not a strong function of  $i$  concentration
- e) Gases diffuse about 10 cm/minute

### Low Molecular Weight Liquids

- a)  $D_{is} \approx 10^{-5} \text{ cm}^2/\text{s}$  ( $10^{-9} \text{ m}^2/\text{s}$ )
- b)  $D_{is} \propto T$  (Absolute temperature)
- c)  $D_{is}$  is not a strong function of pressure
- d)  $D_{is}$  can be a strong function of  $i$  concentration
- e) Substances in liquids diffuse about 0.05 cm/minute

### Solids

- a)  $D_{is}$  can vary over a wide range. It depends on “lattice” structure and interactions. (For example Al in Cu diffuses  $10^{15}$  times slower than Cd in Cu (even though Al is molecularly smaller))
- b)  $D_{is}$  is a strong complex function of temperature
- c)  $D_{is}$  is not a strong function of pressure
- d)  $D_{is}$  is a strong function of  $i$  concentration
- e) Difficult to generalize how fast solids diffuse