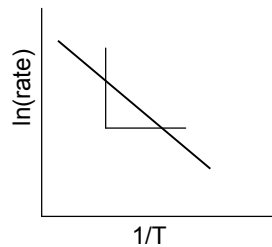


Rate process

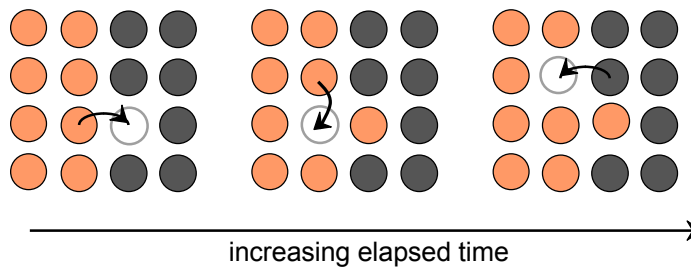


Chapter 5: Diffusion in Solids

MAE 20

1

Diffusion Mechanisms



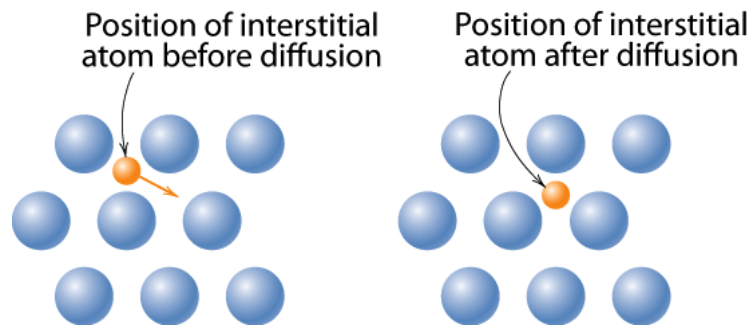
Chapter 5: Diffusion in Solids

MAE 20

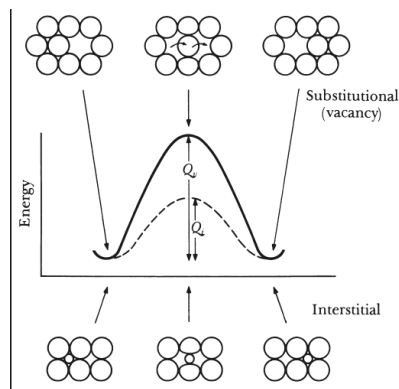
2

Diffusion Mechanisms

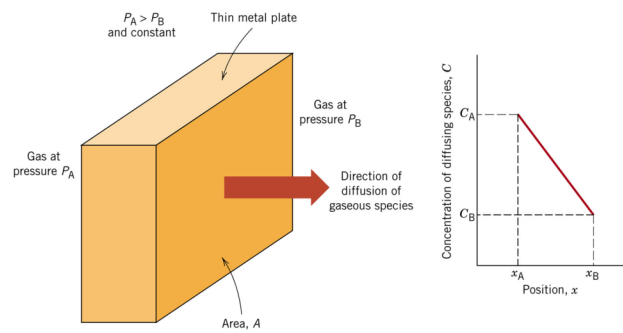
- **Interstitial diffusion**



Vacancy and interstitial diffusion



Steady state diffusion

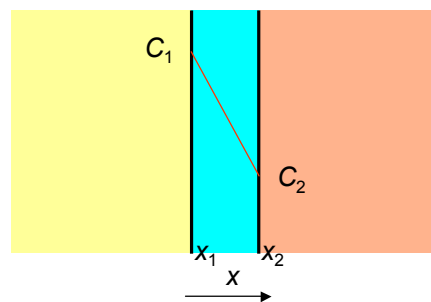


Chapter 5: Diffusion in Solids

MAE 20

5

Steady-State Diffusion

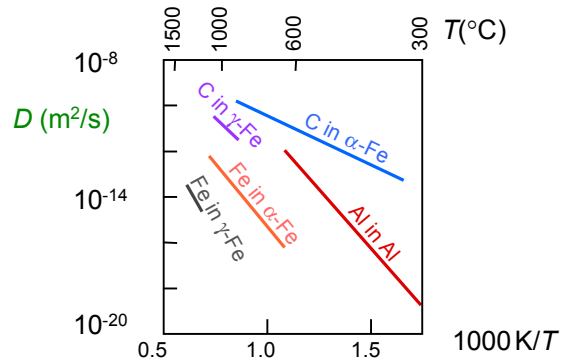


Chapter 5: Diffusion in Solids

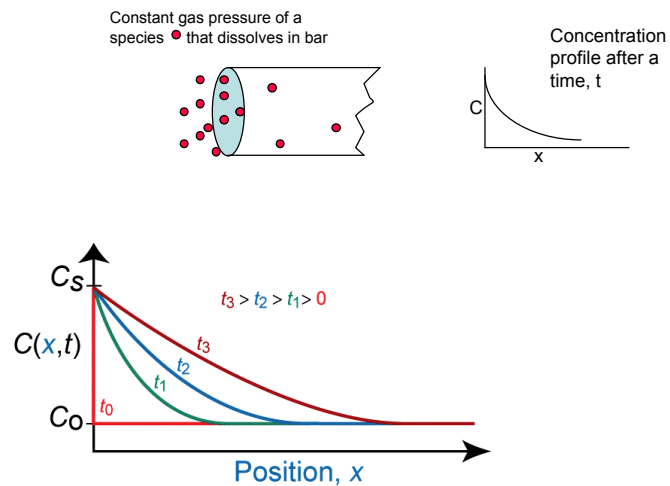
MAE 20

6

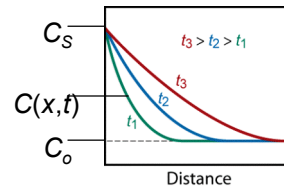
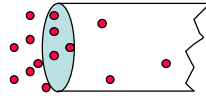
Diffusion and Temperature



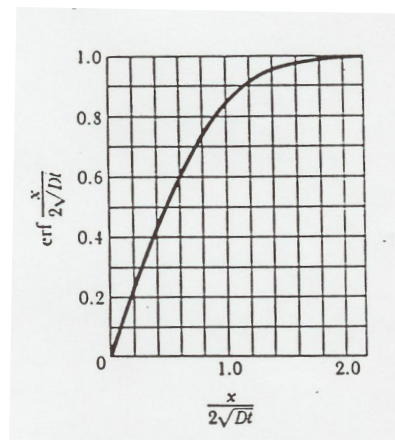
Non-steady state diffusion



Non-steady state diffusion

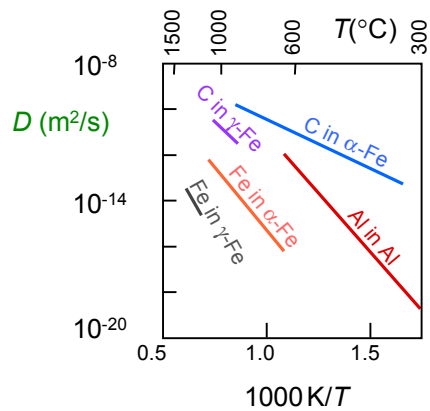


The Error Function



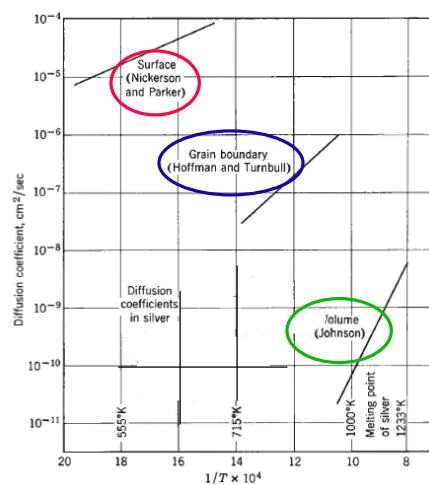
Factors that affect diffusion

- Crystal structure

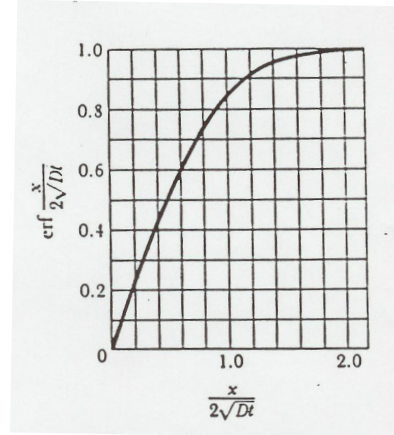


Factors that affect diffusion

- Type of defect



Solution



Interpolation method

Table 5.1 Tabulation of Error Function Values

z	$\text{erf}(z)$	z	$\text{erf}(z)$	z	$\text{erf}(z)$
0	0	0.55	0.5633	1.3	0.9340
0.025	0.0282	0.60	0.6039	1.4	0.9523
0.05	0.0564	0.65	0.6420	1.5	0.9661
0.10	0.1125	0.70	0.6778	1.6	0.9763
0.15	0.1680	0.75	0.7112	1.7	0.9838
0.20	0.2227	0.80	0.7421	1.8	0.9891
0.25	0.2763	0.85	0.7707	1.9	0.9928
0.30	0.3286	0.90	0.7970	2.0	0.9953
0.35	0.3794	0.95	0.8209	2.2	0.9981
0.40	0.4284	1.0	0.8427	2.4	0.9993
0.45	0.4755	1.1	0.8802	2.6	0.9998
0.50	0.5205	1.2	0.9103	2.8	0.9999