MATERIALS SCIENCE & ENGINEERING
TEXAS A&M UNIVERSITY

Introduction to Materials Science & Engineering

Diffusion Activated Process

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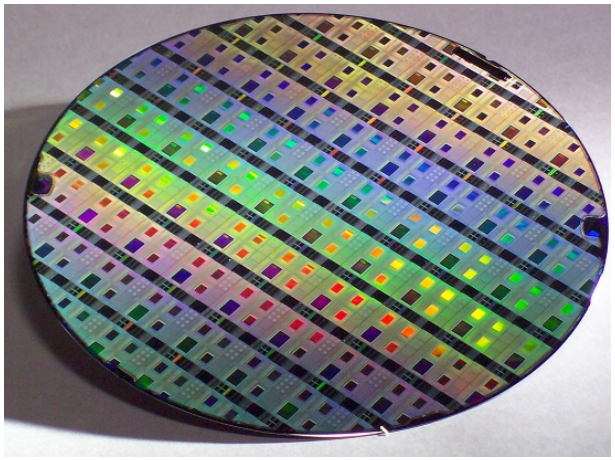
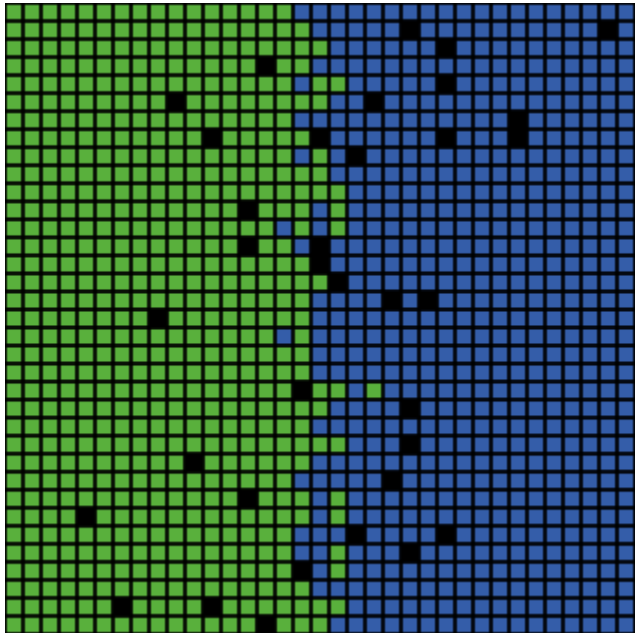
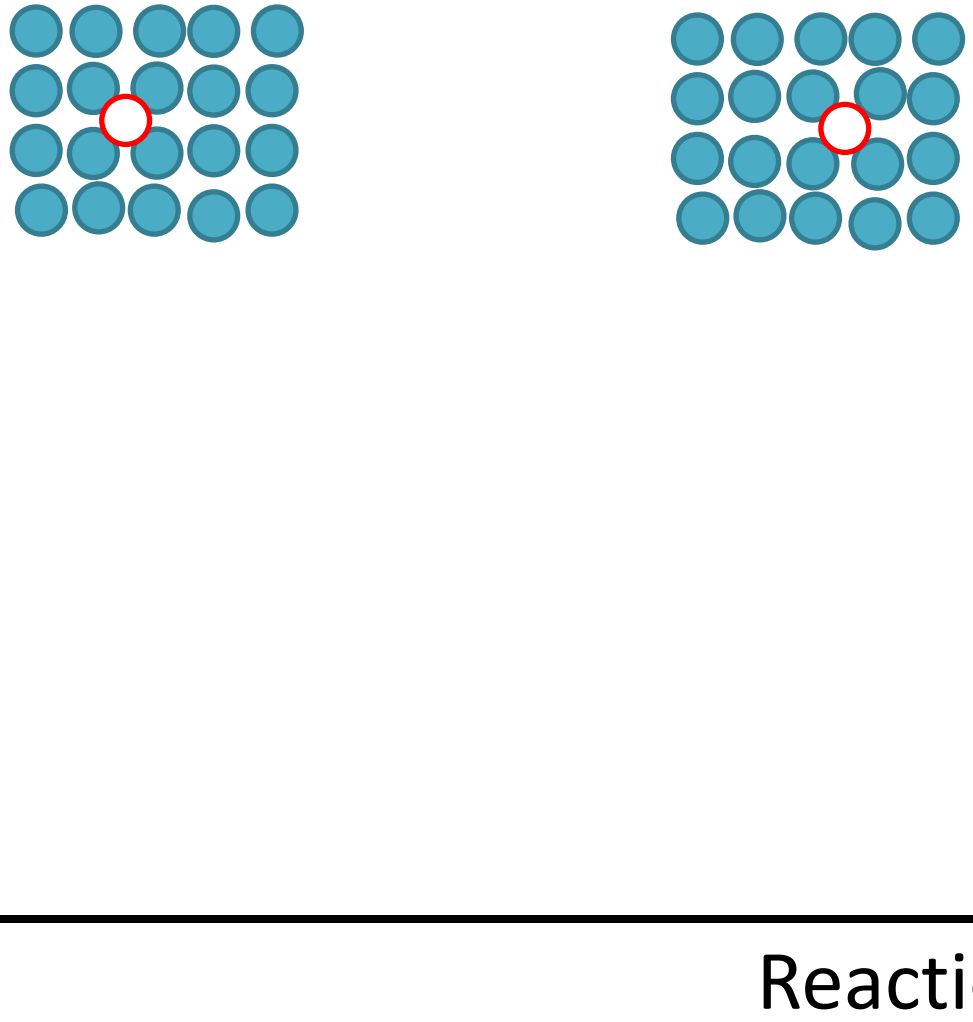
Activated Process



http://www.its.caltech.edu/~atomic/snowcrystals/photos/photos.htm



Reaction Coordinate



Reaction Coordinate

Arrhenian Relationship

$$D = D_o \exp\left(-\frac{Q_d}{R\,T}\right)$$

D = diffusion coefficient [m^2/s]

D_o = pre-exponential [m^2/s]

Q_d = activation energy [J/mol or eV/atom]

R = gas constant [8.314 J/mol-K]

T = absolute temperature [K]

Arrhenian Relationship

$$D = D_o \exp\left(-\frac{Q_d}{R\,T}\right)$$

Summary:

- Definition of thermally activated process
- Examples of activated processes
- Arrhenian relationship
- How to determine activation energy from data