

Chapter 17: Free Energy and Thermodynamics

Georgia Gwinnett College

Chem 1212K

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(B. Shepler)

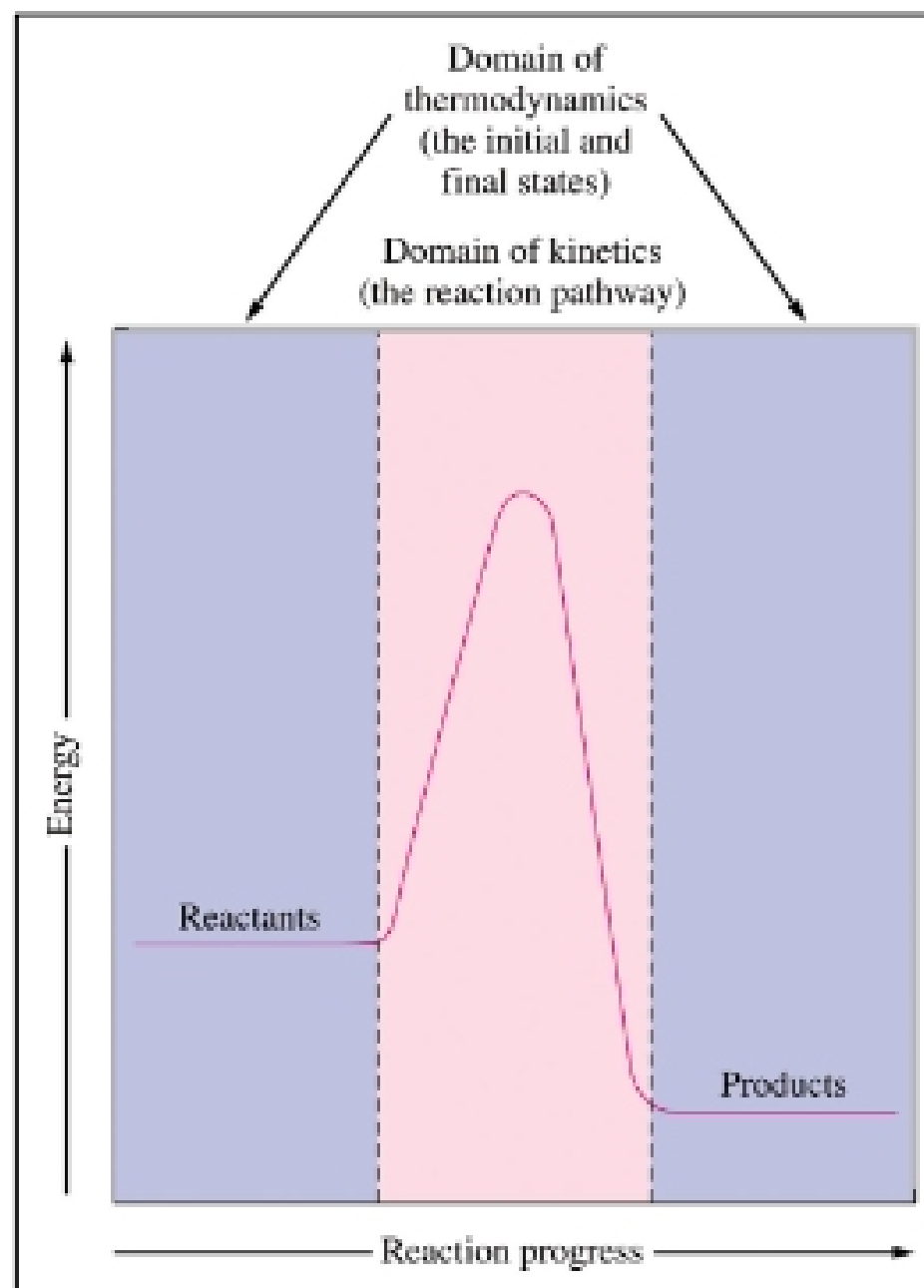
Thermodynamics, Kinetics and Spontaneity

- **Chemical Reactions**

- Thermodynamics predicts direction
- Chemical Kinetics predicts speed (rate) and pathway from reactants to products.

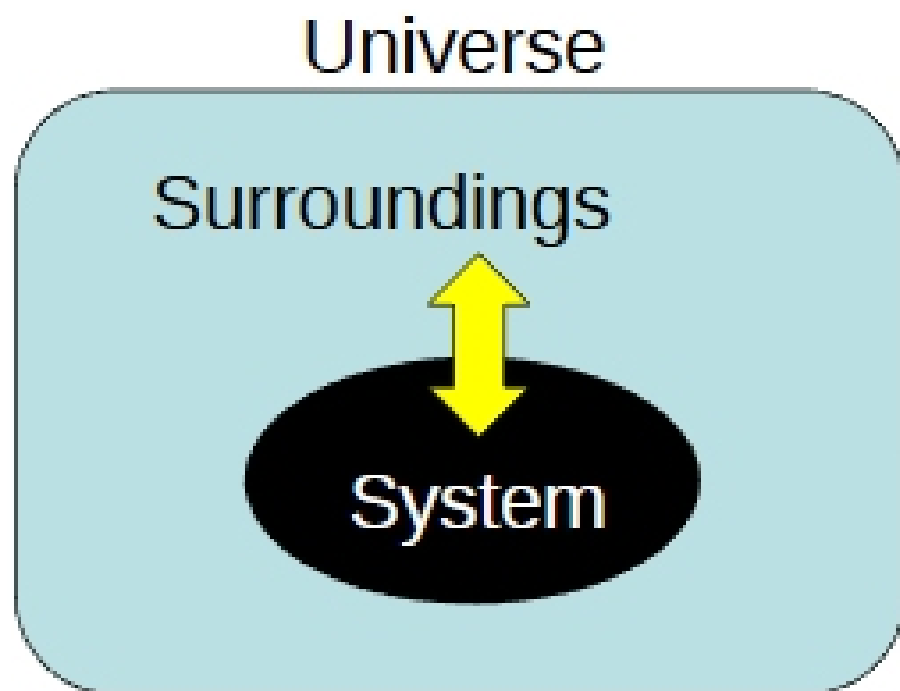
- **Spontaneous Processes**

- Occur without outside intervention
- Spontaneous does not mean fast.
- Nonspontaneous does not mean impossible.
 - It just requires outside intervention



System and Surroundings

- When discussing chemical reactions and thermodynamics we typically divide the universe into two parts:
 - System
 - Surroundings



We can **exchange energy** between the system and surroundings **through heat or work**.