

Kinetics

Kinetics deals with '*what rate and whether* a particular reaction will take place.

There are many thermodynamically favorable reactions that do not occur spontaneously. File:Activation-energy-without-enzyme-cj.png

Everyone knows that burning wood in the air releases a large amount of energy that can be turned into work. Oxidation of wood cellulose by oxygen to water and carbon dioxide must have negative ΔG values. How is it that there are any forests left in our oxygen-rich atmosphere? Similarly, diamonds, often considered "eternal", are thermodynamically unstable modifications of graphite or carbon black.

Some reactions may be **thermodynamically feasible, but kinetically improbable.** This phenomenon, called a **kinetic barrier**, is caused by the existence of unstable transition states (activated complexes). These are formed only when a larger amount of energy is supplied (the formation of an activated complex is thermodynamically unfavorable). This additional energy is called **activation energy** (E_A).