**Spontaneous and**

**Nonspontaneous Reactions**

**A spontaneous reaction always moves a reaction mixture toward equilibrium.**

**By contrast, a nonspontaneous reaction moves the composition of the mixture away from the equilibrium composition.**

**Remember: the word “spontaneous” doesn’t always mean “fast”.**

**Spontaneous reactions can be fast or slow (Iron rusting is a slow spontaneous reaction).**

**Thermodynamics tells us where a reaction is headed, but nothing about how long it takes to get there.**

**Reaction progress (length of the reaction) is spontaneous if the Activation Energy (Ea) of the reactants is larger than the Enthalpy of the products ( E or Hproducts).**

