

chapter twelve: thermodynamics

12.1
spontaneity

Spontaneous process: process that occurs without intervention once started

nonspontaneous process: occurs only if energy is continually added

spontaneity depends on dispersion of energy during process
* note: spontaneity $\neq$ speed

many spontaneous rxns are exothermic, but not all
 ΔH only tells part of the story

forming a chemical bond releases energy ($\Delta H < 0$)
energy must be added to break a bond ($\Delta H > 0$)

$\Delta H < 0$ exo
 $\Delta H > 0$ endo

Entropy (S): measure of how dispersed energy is in a system at a certain temperature
→ energy distribution is affected by molecular motion and volume

Second law of Thermodynamics: entropy of the universe increases in any spontaneous process

$$\Delta S_{\text{univ}} = (\Delta S_{\text{sys}} + \Delta S_{\text{surr}}) > 0$$