

# Thermodynamics

## I. First Law of Thermodynamics (review)

- internal energy (U)
- work

## II. Second Law of Thermodynamics

- spontaneity
- entropy (S)

## III. Third Law of Thermodynamics

## IV. Free energy

- criterion for spontaneity
- $\Delta G$  and the thermodynamic equilibrium constant
- interpretation
- coupling spontaneous reactions to nonspontaneous reactions
- $\Delta G$  and temperature