Review for Thermodynamics Quiz

1) Define the following terms: thermodynamics, kinetic energy, potential energy, temperature, law of conservation of energy, heat, work, system, surroundings, universe, enthalpy, heat of combustion, standard heat of formation, heat capacity, specific heat, calorimetry, Hess's Law, standard conditions, standard state, spontaneity, second law of thermodynamics, entropy, Gibbs free energy.

2) How much energy is required to heat 50 grams of water from a solid at -20^0 C to steam at 170^0 C, given the following information:

C_p of ice	ΔH_{fus}	C_p of water	ΔH_{vap}	C_p of steam
1.8 J/g^{0}C	6.0 kJ/mol	4.2 J/g^{0}C	40.6 kJ/mol	1.9 J/g^{0}C

3) Why doesn't the temperature of a substance change during a phase change?

4) Calculate ΔH_{rxn} for: $2\ C + O_2 \rightarrow 2\ CO$, given that:
- $C + O_2 \rightarrow CO_2$ $\Delta H_{rxn} = -394$ kJ
- $2\ CO + O_2 \rightarrow 2\ CO_2$ $\Delta H_{rxn} = -283$ kJ

5) Determine the enthalpy change for the reaction: $CaCO_3 \rightarrow CaO + CO_2$, given that the heat of formation of calcium carbonate is -1207 kJ/mol, the heat of formation of calcium oxide is -636 kJ/mol, and the heat of formation of carbon dioxide is -394 kJ/mol.

6) The reaction $A + B \rightarrow C + D$ has a ΔH_{rxn} of 110 kJ and a ΔS_{rxn} of 185 J/K. At what temperature (if any) is this reaction at equilibrium?

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