

Please answer the following (showing all work) in the blank space below the questions.

Review and Practice

- For each of the following reactions; decide whether the reactants or the products have the greater entropy. Indicate the cases in which no change occurs.
 - $2\text{Al}(s) + 6\text{HCl}(aq) \longrightarrow 2\text{AlCl}_3(aq) + 3\text{H}_2(g)$
 - $\text{CaCO}_3(s) \longrightarrow \text{CaO}(s) + \text{CO}_2(g)$
 - $\text{N}_2(g) + 3\text{H}_2(g) \longrightarrow 2\text{NH}_3(g)$
 - $\text{H}_2(g) + \text{I}_2(g) \longrightarrow 2\text{HI}(g)$
 - $\text{I}_2(s) \longrightarrow \text{I}_2(\text{alcohol solution})$
 - $\text{H}_2\text{O}(l) \longrightarrow \text{H}_2\text{O}(s)$
- For each of the following reactions, decide on the basis of entropy and enthalpy considerations whether a reaction in the direction shown will go to completion, reach a state of equilibrium, or not occur at all. (Assume a closed system.)
 - $\text{Cl}_2(g) \longrightarrow \text{Cl}_2(aq) + 25 \text{ kJ}$
 - $\text{Na}(s) + \text{H}_2\text{O}(l) \longrightarrow \text{Na}^+(aq) + \text{OH}^-(aq) + \frac{1}{2}\text{H}_2(g); \Delta H = -184 \text{ kJ}$
 - $\frac{1}{2}\text{N}_2(g) + \text{O}_2(g) \longrightarrow \text{NO}_2(g); \Delta H = +33.8 \text{ kJ}$
 - $\text{P}_4(s) + 6\text{H}_2(g) \longrightarrow 4\text{PH}_3(g); \Delta H = +37 \text{ kJ}$
 - $\text{Na}_2\text{CO}_3(s) + 2\text{HCl}(aq) \longrightarrow 2\text{NaCl}(aq) + \text{CO}_2(g) + \text{H}_2\text{O}(l) + 27.7 \text{ kJ}$

1.)

2.)