

LE CHÂTELIER'S PRINCIPLE

Directions: Using Le Châtelier's principle, determine if the reaction will shift to the right (favors forward reaction) or shift to the left (favors reverse reaction), and tell why according to the table listing the effects of change on equilibrium.

1. In the equation, $\text{N}_{2(\text{g})} + 3\text{H}_{2(\text{g})} \rightarrow 2\text{NH}_{3(\text{g})}$, if you increase the concentration of $\text{N}_{2(\text{g})}$, the reaction will shift to the right (Increasing the concentration of one substance favors the reaction that produces less of that substance.)
2. In the equation, $\text{N}_{2(\text{g})} + 3\text{H}_{2(\text{g})} \rightarrow 2\text{NH}_{3(\text{g})}$, if you increase the concentration of $\text{H}_{2(\text{g})}$, the reaction will shift to the right (Increasing the concentration of one substance favors the reaction that produces less of that substance.)
3. In the equation, $\text{N}_{2(\text{g})} + 3\text{H}_{2(\text{g})} \rightarrow 2\text{NH}_{3(\text{g})}$, if you increase the concentration of $\text{NH}_{3(\text{g})}$, the reaction will shift to the left (Increasing the concentration of one substance favors the reaction that produces less of that substance.)
4. In the equation, $\text{N}_{2(\text{g})} + 3\text{H}_{2(\text{g})} \rightarrow 2\text{NH}_{3(\text{g})}$, if you increase the pressure, the reaction will shift to the right (Increasing pressure favors the reaction that produces less gas.)
5. In the exothermic equation, $\text{N}_{2(\text{g})} + 3\text{H}_{2(\text{g})} \rightarrow 2\text{NH}_{3(\text{g})}$, if you increase the temperature, the reaction will shift to the left (Increasing temperature favors the reaction that absorbs energy.)
6. In the equation, $\text{H}_3\text{O}^+_{(\text{aq})} + \text{HCO}_3^-_{(\text{aq})} \rightarrow \text{H}_2\text{CO}_{3(\text{aq})} + \text{H}_2\text{O}_{(\text{l})}$, if you increase the concentration of $\text{H}_3\text{O}^+_{(\text{aq})}$, the reaction will shift to the right (Increasing the concentration of one substance favors the reaction that produces less of that substance.)
7. In the equation, $\text{H}_3\text{O}^+_{(\text{aq})} + \text{HCO}_3^-_{(\text{aq})} \rightarrow \text{H}_2\text{CO}_{3(\text{aq})} + \text{H}_2\text{O}_{(\text{l})}$, if you increase the concentration of $\text{HCO}_3^-_{(\text{aq})}$, the reaction will shift to the right (Increasing the concentration of one substance favors the reaction that produces less of that substance.)
8. In the equation, $\text{H}_3\text{O}^+_{(\text{aq})} + \text{HCO}_3^-_{(\text{aq})} \rightarrow \text{H}_2\text{CO}_{3(\text{aq})} + \text{H}_2\text{O}_{(\text{l})}$, if you increase the concentration of $\text{H}_2\text{CO}_{3(\text{aq})}$, the reaction will shift to the left (Increasing the concentration of one substance favors the reaction that produces less of that substance.)
9. In the equation, $\text{H}_3\text{O}^+_{(\text{aq})} + \text{HCO}_3^-_{(\text{aq})} \rightarrow \text{H}_2\text{CO}_{3(\text{aq})} + \text{H}_2\text{O}_{(\text{l})}$, if you increase the pressure, the reaction will not shift at all (Pressure does not have an affect on liquids like it does on gases, therefore no shift.)
10. In the reaction, $\text{C}_2\text{H}_6_{(\text{g})} + 137 \text{ kJ} \rightarrow \text{C}_2\text{H}_4_{(\text{g})} + \text{H}_2_{(\text{g})}$, if you increase the temperature, the reaction will shift to the right (Increasing temperature favors the reaction that absorbs energy.)