Mrs. Kornelsen

LCP Practice Quiz Answers

Consider the following reaction at equilibrium.

N_2 (g) + 3 H_2 (g) ⇌ 2 NH_3 (g)

1. Suppose additional nitrogen (N_2) was added to the system.
    a. What direction will the system need to shift in order to achieve equilibrium? **Right**
    b. What will happen to the [NH_3]? **It will increase**

2. Suppose some ammonia (NH_3) was removed from the system.
    a. What direction will the system need to shift in order to achieve equilibrium? **Right**
    b. What will happen to the [NH_3]? **It will increase**

3. Suppose some hydrogen (H_2) was removed from the system.
    a. What direction will the system need to shift in order to achieve equilibrium? **Left**
    b. What will happen to the [NH_3]? **It will decrease**

4. Suppose the pressure is increased.
    a. What direction will the system need to shift in order to achieve equilibrium? **Right**
    b. What will happen to the [NH_3]? **It will increase**

5. Suppose the volume is increased.
    a. What direction will the system need to shift in order to achieve equilibrium? **Left**
    b. What will happen to the [NH_3]? **It will decrease**

6. Suppose a catalyst is added to the system.
    a. What direction will the system need to shift in order to achieve equilibrium? **No shift**
    b. What will happen to the [NH_3]? **No change**

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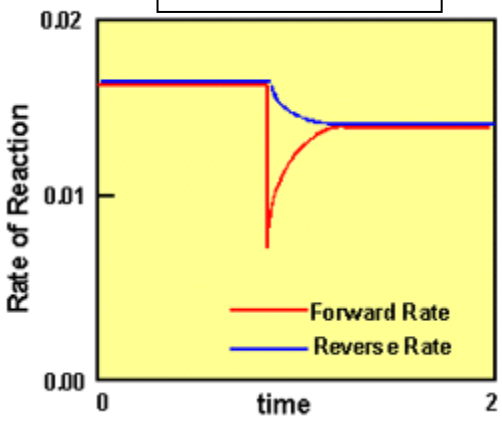
Consider this reaction at equilibrium

$$2\ NO_2(g) \leftrightarrow N_2O_4(g) \quad + \text{heat} \qquad \Delta H = -58.0\ kJ/mol\ N_2O_4$$

1. Is this reaction endothermic or exothermic?
   exothermic
2. Do you need to add or remove heat to make it shift left?
   Add heat
3. Given the following graph what stress was done to the system? NO2 removed and the forward reaction decreased
   a. What did the system do to compensate? Shifted left
   b. What was the effect on the $[N_2O_4]$? It decreased

Graph 1



4. Given the following graph what stress was done to the system? NO2 was added and its concentration spiked
   a. What did the system do to compensate? It shifted right
   b. What was the effect on the $[N_2O_4]$? It increased

Graph 2