Tutorial #1 Le Chatelier's Principle

Define **Le Chatelier's Principle:**

What happens when **concentration** is changed by adding or removing a reactant or product?

What happens when concentration is changed by **changing the PRESSURE?**

What happens with **temperature** is changed?

Catalysts
What effect do they have on equilibrium?

Sample Exercise 15.12

Consider the equilibrium :

$$N_2O_4\,(g) \Leftrightarrow 2NO_2(g) \quad \Delta H° = 58.0\ kJ$$

In which direction will the equilibrium shift when (a) N_2O_4 is added, (b) NO_2 is removed, (c) the pressure is increased by the addition of N_2, (d) the volume is increased, (e) the temperature is decreased?

Practice Exercise 2

For the reaction: $PCl_5\,(g) \Leftrightarrow 2PCl_3(g) + Cl_2\,(g) \quad \Delta H° = 87.9\ kJ$

In which direction will the equilibrium shift when (a) $Cl_2\,(g)$ is removed, (b) the temperature is decreased, (c) the volume of the reaction system is increased, (d) $PCl_3\,(g)$ is added.

Practice Exercise 2

Using the thermodynamic data in Appendix C , determine the enthalpy change for the reaction: $POCl_3\,(g) \Leftrightarrow 2PCl_3(g) + O_2\,(g)$

Use this result to determine how the equilibrium constant for the reaction should change with temperature.