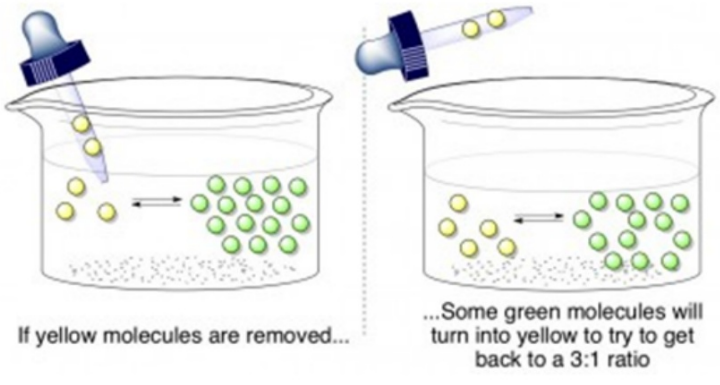
LeChatelier's Principle

Objective: The student will be able to apply LeChatelier's Principle to describe shifts in the equilibrium position.

Le Chatelier's Principle



Introduces a "stress" to a system in equilibrium.

Discussed as a shift in the reaction:

- Shift left = increase [reactants]
- shift right = increase [products]

Examples of Stress

1. Add a substance to a side: shift to other side
2. Remove a substance: shift to same side
3. Increase pressure: shift to side with fewer moles
4. Decrease pressure: shift to side with more moles
5. Increase temperature: shifts to right

Example Problems

Let's use this key to answer these questions about the following system:

A) increases; B) decreases; C) no change;
D) cannot determine; E) shifts right; F) shifts left

$2\ A + 3\ B \Longleftrightarrow 5\ C + 2\ D \quad \Delta H = -55.4\ kJ \quad T = 879\ K$

1. Increasing the concentration of A would have what effect on the value of K_C?

2. Decreasing the temperature would have what effect on the value of K_C?

3. Putting a solid catalyst (promoter) into the reaction vessel would have what effect on the [C]?

Example Problems

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$2\ A + 3\ B \Longleftrightarrow 5\ C + 2\ D \quad \Delta H = -55.4\ kJ \quad T = 879\ K$

4. Removing some reactant B from the reaction would have what effect on [D]?

5. Increasing the pressure on the reaction would have what effect on the position of the equilibrium?