# AP LAB 07I: Le Châtelier's Principle Simulation I

Use the following URL to answer the questions that follow;

**https://bit.ly/2pK7cmU**

**Experiment 1:** Click on the cobalt system.

$$CoCl_4^{2-}{}_{(aq)}\ \{blue\} + 6H_2O_{(l)} \rightleftharpoons Co(H_2O)_6^{2+}{}_{(aq)}\ \{red\} + 4Cl^-{}_{(aq)} + ENERGY$$

You will be shown a chemical equilibrium reaction at the top of the page and a photograph of a purple solution surrounded by icons. Clicking on each icon in turn will show a pair of photographs. The first one is a photograph of the solution as it was BEFORE action indicated by the click, the second photograph is the change in solution as a RESULT of the action indicated by the click. Answer the questions below.

(a) Why is the solution purple at the beginning?

(b) For each action, consider the changes that are observed and explain why they took place.

| | Observation (change) | Explanation |
|---|---|---|
| **Heating** | | |
| **Cooling** | | |
| **Adding KCl solution** | | |
| **Adding water** | | |
| **Adding $AgNO_3$ solution** | | |

**Experiment 2:** Click on the chromate system.

$$2CrO_4^{2-}{}_{(aq)}\ \{yellow\} + 2H^+_{(aq)} \rightleftharpoons Cr_2O_7^{2-}{}_{(aq)}\ \{red\} + H_2O_{(l)}$$

You will be shown a chemical equilibrium reaction at the top of the page and a photograph of an orange solution surrounded by icons. Clicking on each icon in turn will show a pair of photographs. The first one is a photograph of the solution as it was BEFORE action indicated by the click, the second photograph is the change in solution as a RESULT of the action indicated by the click. Answer the questions below.

(a) Why is the solution orange at the beginning?

(b) For each action, consider the changes that are observed and explain why they took place.

| | Observation (change) | Explanation |
|---|---|---|
| **Adding HCl** | | |
| **Adding NaOH** | | |

**Experiment 3:** Click on the nitrogen dioxide system.

$$2NO_{2(g)}\ \{\text{brown}\} \rightleftharpoons N_2O_4\ \{\text{colorless}\} + \text{ENERGY}$$

You will be shown a chemical equilibrium reaction at the top of the page and a photograph of a pale brown gas surrounded by icons. Clicking on each icon in turn will show a pair of photographs. The first one is a photograph of the solution as it was BEFORE action indicated by the click, the second photograph is the change in solution as a RESULT of the action indicated by the click. Answer the questions below.

(a) Why is the gas pale brown at the beginning?

(b) For each action, consider the changes that are observed and explain why they took place.

| | Observation (change) | Explanation |
|---|---|---|
| **Heating** | | |
| **Cooling** | | |

**Experiment 4:** Click on the iron thiocyanate system.

$$Fe^{3+}_{(aq)}\ \{\text{pale yellow}\} + SCN^{-}_{(aq)} \rightleftharpoons FeSCN^{2+}_{(aq)}\ \{\text{red}\} + \text{ENERGY}$$

You will be shown a chemical equilibrium reaction at the top of the page and a photograph of a pale orange solution surrounded by icons. Clicking on each icon in turn will show a pair of photographs. The first one is a photograph of the solution as it was BEFORE action indicated by the click, the second photograph is the change in solution as a RESULT of the action indicated by the click. Answer the questions below.

(a) Why is the solution pale orange at the beginning?

(b) For each action, consider the changes that are observed and explain why they took place.

| | Observation (change) | Explanation |
|---|---|---|
| **Heating** | | |
| **Adding KSCN solution** | | |
| **Adding $Na_2HPO_4$ solution** | | |
| **Adding $Fe(NO_3)_3$ solution** | | |