<https://www.youtube.com/watch?v=crr5ZMHCJ_Y&t=8s>

Purpose: Study two of the stresses of Le Chatelier’s Principle. See how these stresses change the color of the cobalt compound. Concentration and temperature will be the stresses changed and studied. Le Chatelier’s Principle states that if a reaction at equilibrium is subjected to a stress, the system will react to remove the stress and get back to equilibrium. To remove the stress it can reduce the reactants and make more products or make more products and reduce the number of reactants.

Co(H2O)62+(aq) + 4Cl-(aq) 🡨🡪 CoCl42-(aq) + 6H2O(l)

PINK BLUE

Prior Knowledge questions:

1. What is the charge of the Cobalt ion(Co) in the Blue solution CoCl42-(aq)?
2. What are the three stresses in Le Chatelier’s Principle?
3. How should the ice bath and hot water bath affect the cobalt color?
4. Watch Le Chatelier Video

Observations and data

|  |  |
| --- | --- |
| Test Tube | Observation |
| Control Test tubes 1 - 4 |  |
| HCL Added  Test Tube 1 |  |
| CaCl2 Added  Test Tube 2 |  |
| H2O Added  Test Tube 1 |  |
| HCl/AgNO3 Added  Test Tube 3 |  |
| Heat Added  Test Tube 4 |  |
| Heat Removed  Test Tube 4 |  |

Questions: use your knowledge of LeChatelier’s Principle and the equation above to answer these questions.

1. Write the thermo-Chemical reaction showing which side heat should be placed.
2. Is this reaction exothermic or endothermic?
3. Explain all your observations using le Chatelier Principles.
4. Explain how this lab demonstrates Le Chatelier’s Principle.
5. Write out the Keq equation for this reaction.
6. What direction would the reaction shift to if you increased the pressure of the reaction?
7. What effect does each of the following changes have on the equilibrium position for this reversible reaction?

PCl5(g) + heat ↔ PCl3(g) + Cl2(g)

* 1. addition of Cl2
  2. Increase the pressure
  3. removal of heat
  4. removal of PCl3 as it formed

1. What effect do each of the following changes have on the equilibrium position for this reversible reaction?

C(s) + H2O(g) + heat ↔ CO(g) + H2(g)

* 1. Lower the temperature
  2. Increase the pressure
  3. Remove hydrogen
  4. Adding water vapor