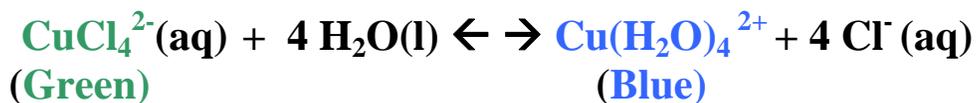


LAB#14 – EQUILIBRIUM OF THE COMPLEX SALT CuCl_4^{2-} (LeChatelier's Principles in action).



MATERIALS:

1. 6 small test tubes. tongs
2. Beaker, ring, ring stand, burner, lighter.
3. $\text{CuCl}_4^{2-}(\text{aq})$
4. 95% ethyl alcohol
5. 16 M HCl(aq) (your teacher will dispense)
6. Ice water.

PROCEDURE:

- 1) **THE CONTROL TUBE:** Fill a test tube about 1/3 with copper(II)chloride solution, this is your control. This tube will not have any procedure done to it, *it is your reference for the experimental tubes.*
- 2) **HEAT STUDY TUBE** (NOTE🎵 - perform study 2 and 3 simultaneously). Fill a tube about 1/3 full of $\text{CuCl}_4^{2-}(\text{aq})$ and carefully place in a hot water, observe the color change and compare to the control, record the resulting color change.
- 3) **COOLING STUDY TUBE:** Fill a tube about 1/3 full of $\text{CuCl}_4^{2-}(\text{aq})$, place the tube in ice water and observe the color change and compare it next to the control tube record the resulting color change..
- 4) **DEHYDRATION STUDY TUBE:** Obtain a tube 1/4 full of the copper(II)chloride solution and add ethyl alcohol to it until you see a decisive color change. Compare the end state of this tube next to the control.

- 5) HYDRATION STUDY TUBE:** Obtain a tube $\frac{1}{4}$ full of the copper(II)chloride solution and distilled water to it until you see a decisive color change. Compare the end state of this tube next to the control.
- 6) COMMON ION EFFECT STUDY TUBE :** Fill a tube about $\frac{1}{3}$ full of $\text{CuCl}_4^{2-}(\text{aq})$, *your teacher will dispense the HCl directly into your tube*. Observe the color change next to the control tube for comparison.

(Michael Ciafa, 2/2007)