Equilibrium and Le Châtelier's Principle – Data to Collect

Use the links for pictures or videos you can use to get the information you need to fill in the blanks for observations below.

Part A. Observation of shifts in the aqueous antimony trichloride system.

***Video of procedure*. Use this to help in lab. Take your own observations in lab.**

Volumes	Observation	Molarity of $SbCl_3$	Molarity of H^+, Cl^-
None			
4.0 mL H_2O			
8.0 mL H_2O			
12.0 mL H_2O			
16.0 mL H_2O			
+2.0 mL 6.0 M HCl			

Part B. Determination of the equilibrium constant for hydrolysis of $SbCl_3$.

The volume of water below is different than what's in the general video watched above.

Volume of water added (mL) _____

Final volume of solution (mL) _____

Molarity of $SbCl_3$ _____

Molarity of H^+, Cl^- _____

Equilibrium constant, K _____

Part C. Observation of the hexaaquacopper(II) – tetrachlorocopper(II) equilibrium
Observations on solids and solutions

Picture of solids.

Video showing addition of water and ethanol to the solids. ***The water is added using the water bottle.***

	$CuCl_2 \bullet 2\ H_2O$	$Cu(NO_3)_2 \bullet 3\ H_2O$
Solid		
Aqueous		
In ethanol		

1.0-mL additions of saturated (6.19 M) NaCl to an aqueous solution of Cu(II)

Picture of test tubes for each volume below. ***The 4.0 mL test tube is the reference tube (5th test tube from the left). Ignore the 9.0 mL and 10.0 mL test tubes. Use this picture to record your observations of the colors.***

Volumes	Observations	Molarity of Cl^-
None		
1.0 mL		
2.0 mL		
3.0 mL		
4.0 mL		
5.0 mL		
6.0 mL		
7.0 mL		
8.0 mL		

1.0-mL additions of water to the solution of $CuCl_4^{2-}$ (produced in step 18, the last line from table above)

Video for Part C - addtion of water.

Volumes	Observations	Molarity of Cl^-
None		
1.0 mL		
2.0 mL		
3.0 mL		
4.0 mL		

Part D. Addition of drops of saturated (6.19 M) NaCl to an ethanolic solution of Cu(II).

Video for Part D. The deep blue solution is the initial Cu^{2+} (from $Cu(NO_3)_2$) in ethanol and the other test tube is the reference test tube from step 14.

Initial color of solution _____

Drops of NaCl required to give color when 4 mL of NaCl was added to aqueous solution _____

Minimal drops of NaCl required to give green solution _____

Concentration of Cl^- in green solution _____

Part E. Determination of the sign of ΔH for the copper(II) system.

Video for Part E.

Color of solution in ice bath _____

Color of solution at room temperature _____

Color of solution in hot water bath. _____