Lecture Notes AA: Solubility Demo’s

1) Registering your handheld

Please go do http://peb.cs.cmu.edu and click on the “register handheld” link. Then enter your Andrew user id into the textbox. This will allow us to give you credit for participating in the concept tests.

2) Correction to Lecture Notes Z

The solubility of AgBr in a 0.2M solution of Na₂S₂O₃.

\[ K_{sp} (AgBr) = 7.7 \times 10^{-13} \]

\[ Ag^+(aq) + 2 S_2O_3^{2-}(aq) \leftrightarrow Ag(S_2O_3)_2^{3-}(aq) \quad K=1.7 \times 10^{13} \]

3) Orange tornado

In this demo, a solution of KI is mixed with Hg(NO₃)₂

What solid is precipitated:
  a) Hg₂I     b) HgI₂     c) HgI₃     d) KNO₃

When more KI solution is added, the solid re-dissolves. This is due to:

  a) the common ion effect
  b) the effects of pH on solubility
  c) the formation of the complex ion HgI⁺
  d) the formation of the complex ion HgI₃⁻
4) **Baryta water + sulfuric acid**

0.1M baryta water \( \text{Ba(OH)}_2 \) \hspace{1cm} 0.1M \( \text{H}_2\text{SO}_4 \) \( \text{pK}_{a1} = 2 \), \( \text{pK}_{a2} = 2.0 \)

A light bulb conductivity tester will first be placed in the baryta water.

When 1 equivalent of sulfuric acid is added to the baryta water:

- a) the light will get dimmer
- b) the light will get brighter
- c) the light will stay the same

When 2 equivalents of sulfuric acid are added to the baryta water:

- a) the light will get dimmer
- b) the light will get brighter
- c) the light will stay the same

5) **The Silver One-Pot Reaction**

We will start with 200ml of distilled water in a 600ml beaker

10ml of 0.1M \( \text{AgNO}_3 \) will be added

Then 2ml of 0.1M \( \text{NaHCO}_3 \) will be added. This forms \( \text{Ag}_2\text{CO}_3 \) (s, white)

When we add 10ml of 0.1M \( \text{NaOH} \). What will happen?

- a) the \( \text{Ag}_2\text{CO}_3 \) will remains
- b) the \( \text{Ag}_2\text{CO}_3 \) will be replaced with \( \text{AgOH} \)
When we add 30ml of 0.1M NaCl, what will happen?
   a) solid will remains as AgOH
   b) AgOH will be converted to AgCl
   c) AgOH will be dissolved due to formation of AgCl$_2^-$

The next step is addition of 35ml of 5M NH$_3$

Then we add 10ml of 0.1M NaBr
In the next two steps we will add:
50ml of 0.1M Na$_2$S$_2$O$_3$
10ml of 0.1M KI

We would like something interesting to happen both times. Should we add:
   a) the Na$_2$S$_2$O$_3$ followed by the KI
   b) the KI followed by the Na$_2$S$_2$O$_3$

The final two steps are:
20ml of 0.1M KCN

10ml of 0.1M Na$_2$S