Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period \_\_\_\_

**Precipitation Lab -** Verifying Solubility Rules

**Objectives:** 1. Learn to write net ionic equations

2. Test the reliability of the solubility rules

3. Gain experience with qualitative observations associated with precipitation reactions

**Pre-Lab:** Use your solubility rules to write the net ionic equation for each reaction and fill in the expected results below. If you expect to see a precipitate, write ppt in the box, if the product is soluble, leave the box blank.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | ***EXPECTED RESULTS*** | **CATIONS** | | | | | |
|  | **Co+2** | **Pb+2** | **Ni+2** | **Cu+2** | **Fe+3** | **Ag+1** |
| **ANIONS** | **SO4-2** |  |  |  |  |  |  |
| **PO4-3** |  |  |  |  |  |  |
| **I-1** |  |  |  |  |  |  |
| **Cl-1** |  |  |  |  |  |  |
| **CO3-2** |  |  |  |  |  |  |
| **OH-1** |  |  |  |  |  |  |
| **CrO4-2** |  |  |  |  |  |  |

**Procedure:**

1. Cover the full-page table with a transparent sheet
2. Record the initial colors of the solutions next to the ions in your experimental data chart.
3. Place 2 drops of each ion in the appropriate boxes on the grid. BE CAREFUL TO AVOID CONTAMINATION! HOLD THE TIP OF THE PIPET AT LEAST 2 INCHES ABOVE THE SHEET.
4. Record observations of color change, precipitate or gas production on your experimental data chart.
5. Pour contents of transparency sheet into the trash can and wipe with a paper towel. Rinse the transparent sheet with plenty of water. Clean your lab station.

**Experimental Data:**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | ***EXPERIMENTAL RESULTS*** | **CATIONS** | | | | | |
|  | **Co+2** | **Pb+2** | **Ni+2** | **Cu+2** | **Fe+3** | **Ag+1** |
| **ANIONS** | **SO4-2** |  |  |  |  |  |  |
| **PO4-3** |  |  |  |  |  |  |
| **I-1** |  |  |  |  |  |  |
| **Cl-1** |  |  |  |  |  |  |
| **CO3-2** |  |  |  |  |  |  |
| **OH-1** |  |  |  |  |  |  |
| **CrO4-2** |  |  |  |  |  |  |

**Net Ionic Equations** – Write the BALANCED net ionic equation for each reaction. Use the solubility rules to indicate the appropriate state of matter for each reactant and product. Then fill in the EXPECTED RESULTS table.

Examples: Co+2 (aq) + SO4-2 (aq) 🡪 CoSO4 (aq)

2 Ag+1 (aq) + SO4-2 (aq) 🡪 Ag2SO4 (s)  (ppt)

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42.

**Analysis:**

1. Examine each row of anions. Which anions generally form precipitates? What are the exceptions?
2. Examine each column of cations. Which cations generally do NOT form precipitates?
3. Compare and contrast your two data charts. Discuss and explain any inconsistencies between the two grids.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **CATIONS** | | | | | |
|  |  | **Co+2** | **Pb+2** | **Ni+2** | **Cu+2** | **Fe+3** | **Ag+1** |
| **ANIONS** | **SO4-2** |  |  |  |  |  |  |
| **PO4-3** |  |  |  |  |  |  |
| **I-1** |  |  |  |  |  |  |
| **Cl-1** |  |  |  |  |  |  |
| **CO3-2** |  |  |  |  |  |  |
| **OH-1** |  |  |  |  |  |  |
| **CrO4-2** |  |  |  |  |  |  |