**CATION GROUP SEPARATION**

**Purpose:**
You can write this section later.

<table>
<thead>
<tr>
<th>Apparatus</th>
<th>Glassware</th>
<th>Chemicals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Universal pH indicator paper</td>
<td>6 4-inch test tubes</td>
<td>0.1 M AgNO₃</td>
</tr>
<tr>
<td>Hot plate</td>
<td>1 stirring rod</td>
<td>0.1 M Cu(NO₃)₂</td>
</tr>
<tr>
<td>Centrifuge</td>
<td>Disposable pipet</td>
<td>0.1 M NaNO₃</td>
</tr>
<tr>
<td>Bunsen burner</td>
<td>Beaker</td>
<td>0.1 M Zn(NO₃)₂</td>
</tr>
</tbody>
</table>

Beaker

Crucible

Pt wire

Cobalt glass

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Due Thursday
Flowchart:

see pre-lab notes

Due Thurs

Safety

- Safety goggles must be worn at all times
- AgNO₃ will......
- Dilute hydrochloric acid......

See Exp. Page 1
A. Setup

Procedure

1. Mix together 0.1 M solutions:
   - 4 drops each of Ag⁺, Cu²⁺, Na⁺, and Zn²⁺
   - 4 drops of 0.1 M HCl; mix well and heat just below boiling for 10 min.

2. Transfer the supernatant to a test tube.
   - Add 0.4 drops of 0.1 M NaOH to the test tube.
   - Add 1 drop of 0.1 M HCl to the test tube.
   - AgCl precipitate forms.
   - Dispose of AgCl (see exp.)

Net-Ionic eqn.

B. Group I Separation

1. Ag⁺ + Cl⁻ → AgCl
   - AgCl precipitate forms.

Net-Ionic eqn.

C. Group II Separation

1. A precipitate forms.
2. Make sure you do not proceed further.
3. The resulting solution is light green.
4. Dispose of excess CuCl₂ solution.
5. Add excess CuCl₂ solution to precipitate AgCl.
6. Dispose of excess CuCl₂ solution after experimentation.

Net-Ionic eqn.

Observations

- Disposal of AgCl (see exp.)
- No additional precipitate forms.
- The precipitate is light blue.
- Approximately ½ proe size amount of white ppt formed.

- Make sure you do not proceed further.
- Use filter paper to filter precipitate.
- Wash precipitate with hot water.
- Dispose of excess NaCl solution.
- Dispose of excess CuCl₂ solution.
- Dispose of excess NaCl solution.
- Dispose of excess CuCl₂ solution.
D. Group IV separation - leave room for at least 4 egsns for group IV after procedure.

E. Group IV separation - leave room for 2 egsns.

F. Group V - leave room for 2 egsns.

I will talk at the questions, summary and purpose later.

Note: All procedure Part A-F is due on Thurs.