

### Lab Prep

Clean beakers and test tubes (make sure small test tubes).

Grab strips of different colored washi tape for labeling.

Grab disposable pipettes.

Fill soap and distilled water.

### Separation of Qual II ions:

Separation of Qual II ions done with strong base, NaOH.

Mn<sup>2+</sup>, Ni<sup>2+</sup>, Fe<sup>2+</sup>. Will precipitate as a Hydroxides.

Al<sup>3+</sup> and Zn<sup>2+</sup> will precipitate soluble Hydroxides.

Add 2 mL of original solution to small cleaned test tube. (DO NOT USE 2 mL WHEN DOING UNKNOWN)

Add 15 drop of 6M NaOH

Centrifuge and save precipitate and supernate. (Test for incomplete reaction; several drops of 6 M NaOH)

Label supernate "Al & Zn ions".

Dissolve the precipitate with the minimum amount of concentrated Nitric Acid (HNO<sub>3</sub>) possible.

If necessary heat the solution.

Label dissolved, " Mn, Ni, & Fe ions"

### Testing for Mn 2+ Presence

Add approximately 1/2 of "Mn, Ni, & Fe" to a small test tube. (DO NOT USE THAT MUCH IF DOING QUAL II UNKNOWN.)

Add solid NaBiO<sub>3</sub> in excess to the solution and centrifuge.

Deep purple solution confirms Mn<sup>2+</sup> ion presence.

### Testing for the presence of Fe 3+

Add remaining 1/2 solution of "Mn, Ni, & Fe" (DO NOT USE ALL IF DOING QUAL II UNKNOWN)

Excess ammonia does not react with Mn the addition is to make Fe a brown precipitate and Ni a blue supernate.

Add 5 drops of 6M NH<sub>4</sub>Cl to the solution

Add concentrated ammonium hydroxide (NH<sub>4</sub>OH) till it is basic to litmus.

Add additional three drops to check for reaction completion.

Centerfuge & save supernate label for Ni testing

Dissolve percipitate with 6M HCl

Add 5 drops of 0.1M NH<sub>4</sub>SCN. Presence of blood red color confirms presence of Fe.

### Testing for Ni Presence

Complexing agent (Dimethylglyoxime) reacting specifically with Ni ions

Using test tube labeled Ni supernate

Appearance of pinkish red precipitate.



### Testing for Al Presence

Addition of acid breaks down Al & Zn Hydroxides to ions

Add HNO<sub>3</sub> drop wise to supernatant labeled "Zn & Al ions" solution must be basic to litmus paper.

Add 5 more drops after that to insure reaction completion.

Presence of white cloudy precipitate indicated presence of Al ions.

Centrifuge and save Zn supernate for analysis.

### Testing for Zn precipitate

Addition of 6M HCl to supernate Zn<sup>+</sup> until solution is acidic to litmus paper

Add 3 drop of 0.2M K<sub>4</sub>[Fe(CN)<sub>6</sub>] and stir.

Centrifuge and discard supernate.

Light green precipitate confirms presence of Zn.



By **wburgener**

[cheatography.com/wburgener/](https://cheatography.com/wburgener/)

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