Exploration of the redox reaction between iron and copper sulfate in neutral aqueous medium.

Pilot experiment

Outline

The aim of this experiment is to determine whether the experimental method can yield usable data. The experiment will basically be an attempt to carry out the reaction, decant the steel/copper wool, dissolve it and obtain the coloured complex. If this is done, the iron determination is also doable.

General method.

The reaction that will take place is:

$Fe_{(s)} + Cu^{2+}_{(aq)} \rightarrow Fe^{2+}_{(aq)} + Cu_{(s)}$

After this, the steel/copper wool will be decanted, filtrated, washed and dissolved in nitric acid.

When the wool is fully dissolved, the nitric acid will be neutralized with Na_2CO_3 to prevent acidity from interfering with the SCN^- , which has acid-base properties.

Once this is done, a solution of KSCN will be added and the coloured complex will be formed.

Materials:

- 20mm glass tube
- $CuSO_4 \cdot 5H_2O$
- Steel wool
- Glass tube grid
- Funnel, filter paper
- 100 ml beakers x5
- Scale
- Erlenmeyer flask
- Distilled water
- Spatula
- Glass rod
- Concentrated nitric acid
- KSCN
- Safety goggles and gloves

Safety.

This experiment requires the use of extremely corrosive nitric acid, so lab coat, safety goggles and gloves must be used at all times. Some fumes may be expelled when the nitric acid is used too, so the experiment must take place in a fume hood.
Disposal of the rests of nitric acid as well as the filtrate and the final solution must be done slowly and carefully.