Revised Procedure 1 — Synthesis of the Iron Oxalate Complex

Use a top-loading balance to weigh 3.2 g of iron (III) chloride (FeCl₃) into a tared 50-mL beaker, to ±0.01 g. Dissolve the solid by slowly adding 8 mL of warm deionized water. Swirl to mix. In the same manner, weigh 13.3 g of potassium oxalate monohydrate (K₂C₂O₄•H₂O) into a tared 100-mL beaker, again to ±0.01 g. Add approximately 20 mL of warm deionized water. To dissolve the solid, you probably will have to heat the K₂C₂O₄•H₂O solution after mixing, but don't boil it. -- It is important that the compound in each beaker be completely dissolved before proceeding. -- Now slowly pour the FeCl₃ solution into the oxalate solution, swirling to mix.

If you let your reaction mixture sit for a few hours, large green crystals will form. Ask your instructor if you should do this. A faster method for getting crystals is to cool the beaker in ice. The crystals that form will be much smaller and less appealing to the eye, but they should have essentially the same composition as those formed over longer periods of time. For the faster method of growth, first prepare an ice bath (ice in a large beaker). Put your 100-mL beaker containing the reaction mixture into the ice bath, and leave it there for about 30 minutes. Green crystals of the desired coordination compound will form.

Regardless of the method of growth selected, after your crystals form you must remove them from the remaining solution. -- Real chemists say that you must "harvest the crystals from the mother liquor." -- Use a Büchner funnel and aspirator flask (see drawing below) to harvest your crystals. Wash the product on the filter paper twice with 15 mL of cold deionized water, then 5 mL of ethanol, and then continue the suction for a few minutes to help the ethanol evaporate. Finally, spread the crystals on a watchglass to dry further.

In the second week of this project, transfer the crystals to a dry vial, and record the weight of complex obtained. (Note that weighing the dry vial before and after transfer is the easiest way to obtain your product’s weight.) The vial must remain capped during storage to prevent gain or loss of moisture from contact with the air. Your product may slowly decompose when exposed to light, so always store the crystals in the dark.