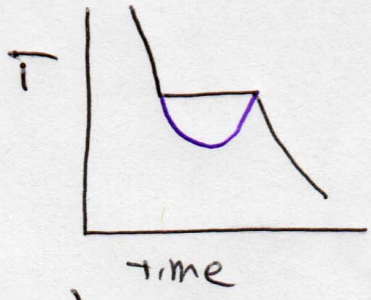
Freezing point depression

- What determines freezing point (KE vs IMF)
- What changes the melting point (weakening of IMF)
- How was the freezing point measured?
  - Initial formation of crystals
  - Temperature vs time → 

  - Supersaturation
- Ice/salt/water bath
  - Depended on ice melting (endothermic)
  - Salt lowered freezing point of sol'n so it would be cold enough for the sol'ns being measured
- Interpretation of data
  - Linear extrapolation

$$k_f = \frac{\Delta T}{m}$$

(y-axis / x-axis)

slope

$$\Delta T = k_f \cdot i \cdot m$$

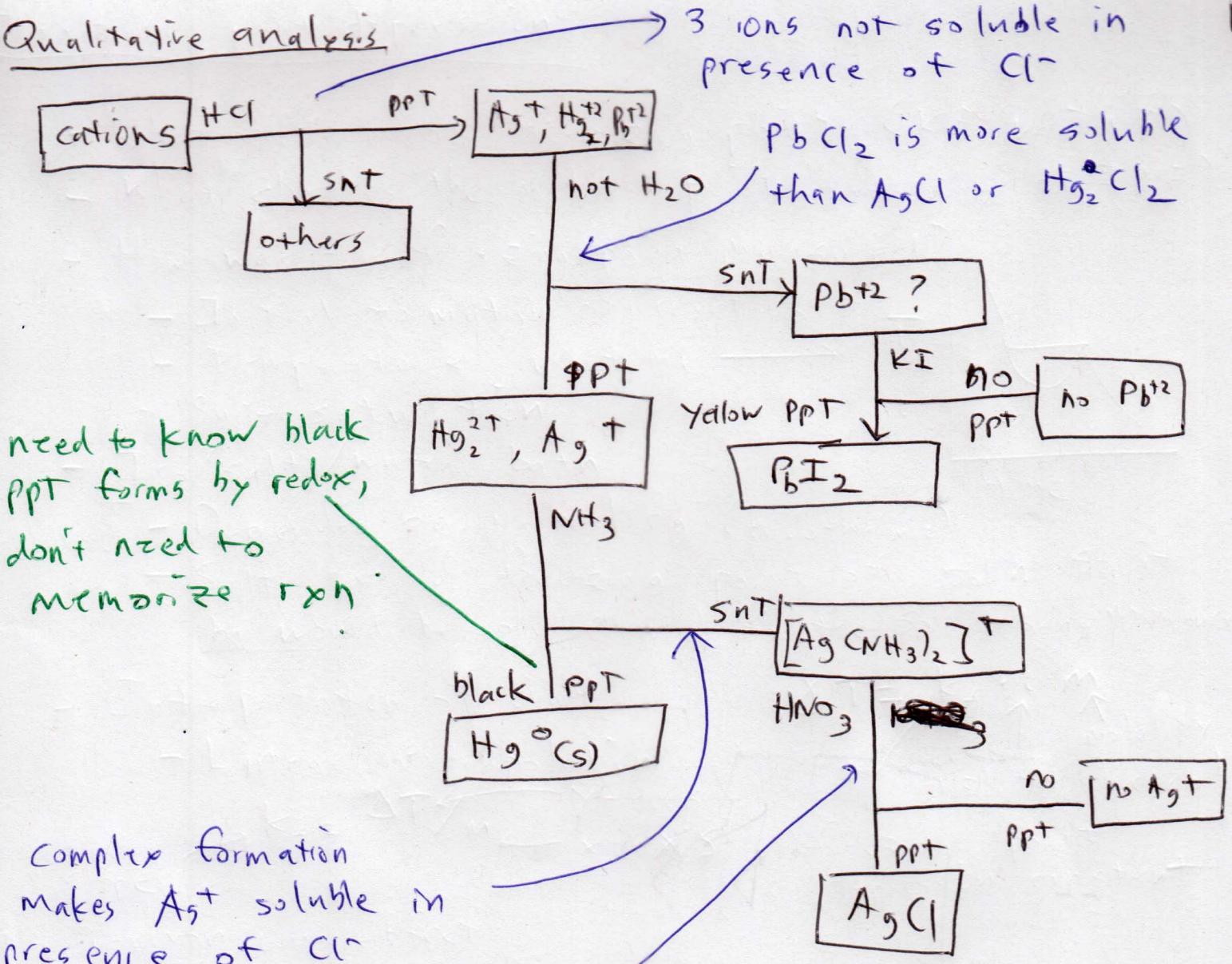
freezing point depression constant; i = 1 for glycerol; m = molality

Common ion effect

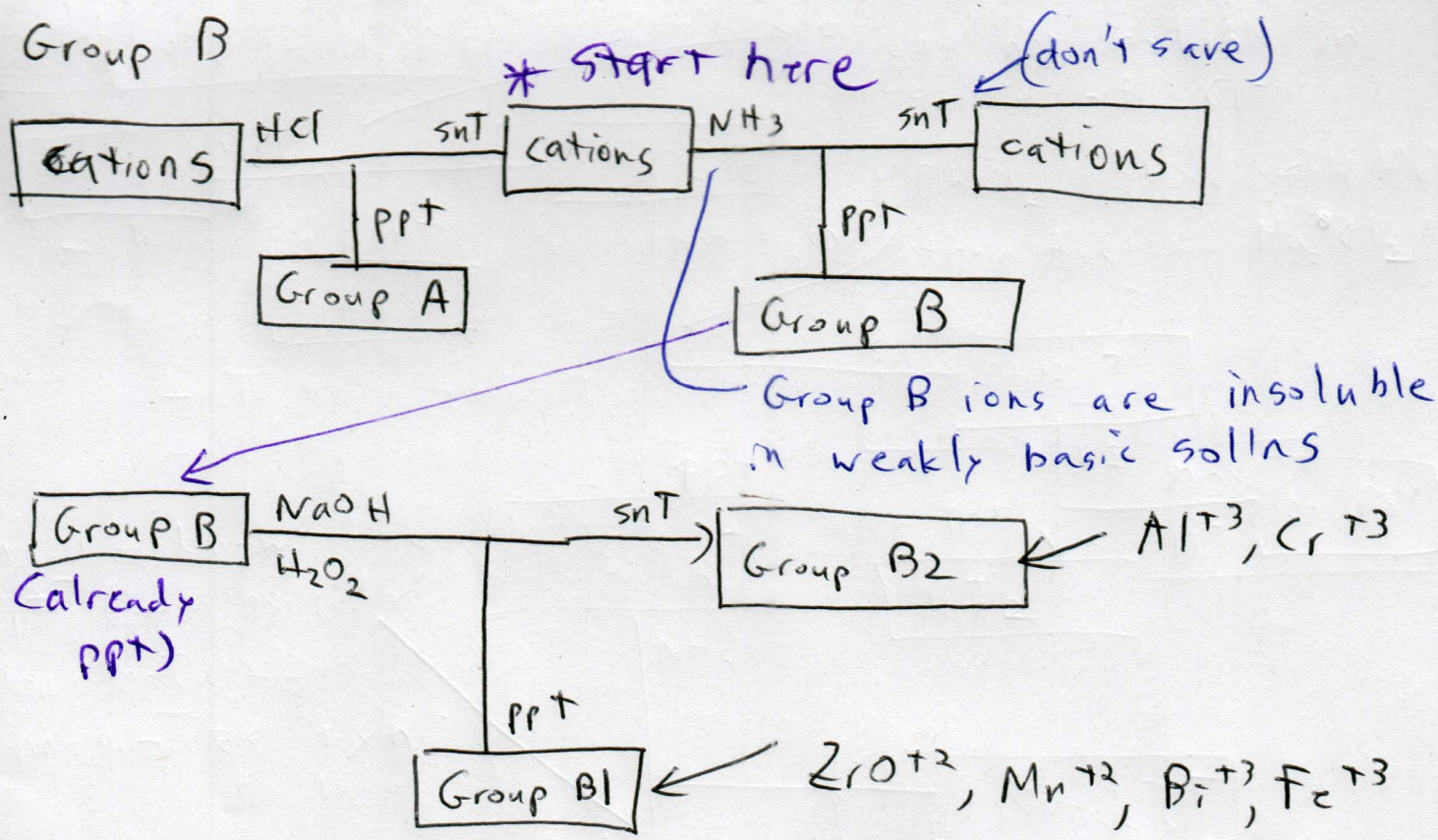
- goal of Part A (K_{sp}) and Part B (CIE)

  sol'n from H_2O — sol'n from $Ca(NO_3)_2$ (aq)
- preparation of $Ca(IO_3)_2$ (s)
- determination of $[IO_3^-]$
  - primary + secondary standards (KIO_3, $S_2O_3^{-2}$)
  - why standardize ($S_2O_3^{-2}$ is deliquescent)
  - stoichiometry → $M_1V_1 = 6M_2V_2$
  - endpoint + starch
- Calculating K_{sp}: $K_{sp} = \frac{1}{2}[IO_3^-]^3$
- demonstrate the CIE

Qualitative analysis



Group B



$$Al(NO_3)_3(aq) + 3NaOH(aq) \rightarrow Al(OH)_3(s) + 3NaNO_3(aq)$$

$$Al(OH)_3(s) + NaOH_{(aq)} \rightarrow Na[Al(OH)_4]$$