Class #8
Solution Stoichiometry

CHEM 107
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Reaction Stoichiometry

• Same idea as for pure substances!
• **Balanced equation!**
• **Moles!**
• Use concentrations and volumes to find numbers of moles
Titration Example

• Titration: find concentration of solution by reaction
  \[ \text{H}_2\text{SO}_4 + 2\text{NaOH} \rightarrow \text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O} \]

• If 20.00 mL of NaOH neutralizes 25.00 mL of 0.0800 M \( \text{H}_2\text{SO}_4 \), what is the NaOH concentration?

Limiting Reagents

• Same idea as before!
• Identify limiting reagent, then solve problem

• Dissolve Mg in HCl:
  1.5 g Mg reacts with 30 mL of 2.0 M HCl. What’s the concentration of Mg\(^{2+}\) in the flask after reaction?
Applied Problem

• HPO$_4^{2-}$ is a water pollutant, but is used in the treatment of sewage
• Removed by treatment with lime (CaO)
• Lime dissolves in water to give Ca$^{2+}$ and OH$^-$
• Phosphorous precipitates as Ca$_5$(PO$_4$)$_3$OH

Phosphate Cleanup

• How many kg of lime are needed to remove all phosphorous from a 10$^4$ L tank which is 0.0156 M in HPO$_4^{2-}$?

☛ Write a balanced equation for dissolving the lime.
☛ Write a balanced equation for the precipitation.
☛ Use those equations to solve.

We’ll work through this in class. It is a good recap of much of what we have been doing for the last few days, although a couple of steps are a little difficult.