Inorganic Ion-Exchange Resin: **Pretreatment**

Glassware & Containers

* (2) Carboys
* (7) 1L Nalgene containers
* (3) Large Weigh boats
* (1) Graduated cylinder
* Scoopers/ spoons
* Hosiery
* Hair ties
* (1) Large beaker

Chemicals

* Potassium Chloride (KCl)
* Resin (IRA-400)
* Resin (IR-120)

Procedure

* In one carboy: create a 2M KCl solution (149 g KCl / 1 L D.I.)
  + Make sure to dissolve completely 🡪 magnetic stir plate
  + Label carboy: “2M KCl, Initials, Date”
* In Nalgene bottles: Add 177g of resin (100 g IRA-400 / 77 g IR-120)
  + + Add 531 mL KCl solution (177 g resin/ 531 mL KCl solution… 3:1 ratio)
  + Shake for 2 hours
  + Label bottles: “Resin IR/IRA”
* After shaker, let resin settle to bottom (~5 min) then +add DI and shake for 5 minutes.
  + Decant D.I., being careful not to lose resin, and repeat 2 more times.
* Following the final decanting, add the resin using a DI squirt bottle to get all resin into a single large carboy.
  + Label: “Pretreated Resin”
* Decant excess water from the carboy:
  + Put hosiery around top of carboy with a hair tie and lift upside down onto a beaker to catch excess water.
  + Let drain for a few hours, while periodically mixing by hand-shaking the carboy.
* Store at 4 C in fridge until deployment.
* \*\* Make sure to set aside three blanks that do not get deployed! \*\*

Inorganic Ion-Exchange Resin: **Extraction**

Glassware & Containers

* (2) Carboy
* 250 mL Nalgene bottles (For: total resin sample)
* 500 mL Nalgene bottles (For: subsamples, extractions, and dilutions)
* Scoopers or spoons
* Funnels
* Filter paper
* ICP vials

Chemicals

* Potassium Chloride (KCl)
* Nitric Acid (NO3)

Procedure

* In one carboy: create a 2M KCl solution (149 g KCl / 1 L DI)
  + Make sure to dissolve completely 🡪 magnetic stir plate
  + Label carboy: “2M KCl, Initials, Date”

1. Getting resin out of hosiery:

* Carefully empty resins into 250 mL Nalgene bottles.
* Record total weight of resin.
* Label Nalgenes: “Well\_id, Total” (i.e., “42\_2, Total”)

1. Subsampling from total sample:

* From the Total resin bottles, subsample 20g of resin into 500 mL Nalgene bottles
  + First record weight of bottle first with the cap! Without resin! In lab book.
  + If needed, make up to three replicates of the same resin into separate bottles (ask Amanda).
  + Label “Well\_id, subsample R#” (i.e., “42\_2, subsample R1” or “42\_2, subsample R2”).
  + Subsample from the blank as well! Label: “Blank 1”, “Blank 2”, “Blank 3”

1. Two extractions for each subsample bottle:

* In subsample bottles +add 240 mL 2M KCl 🡪 shake for 1 hour.
  + While shaking, pre-label 500 mL Nalgene bottles with “Sample\_id” for first extractions.
  + After, filter with funnel & filter paper into “Sample\_id” bottles that corresponds with Extraction #1. \*\*Filtering is time consuming
    - Carefully try not to get any resin onto the filter, if some does then scrape back into subsample bottle. You will not get all the solution and that okay.
    - Reweigh the “Sample\_id” bottle with the resin and leftover solution.
* +Add 240 mL 2M KCl into subsample bottles again. This is for the second extraction. 🡪 Shake 1 hour.
  + Filter with funnel & filter paper into “Sample\_id” bottles that corresponds with Extraction #2.
    - It does not matter if you get resin into this filter, empty the whole bottle at the end into the filter to get any remaining solution.
    - Throw away filter and remaining subsample.

1. Diluting “sample\_id” bottles:

* In a carboy: create a 2% HNO3 solution (1,960 mL DI + 40 mL NO3) WATER FIRST.
  + Make sure to mix completely 🡪 magnetic stir plate
  + Label carboy: “2% HNO3, Initials, Date”
* In a 500 mL extraction bottle, label “Sample\_id, Dilute”.
  + 396 mL of 2% HNO3 + 4 mL solution from extractions.
  + Shake 🡪 1 hour
  + Empty into a ICP sample vial