

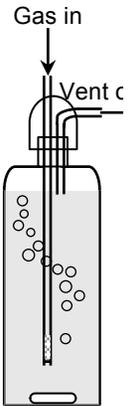
## Ion chromatograph operation instructions:

Complete hardware and software manuals can be found on the computer in the Ion Chromatography folder.

Important: Columns, suppressors, and all lines in the instrument must be capped off tightly when not actively being worked with.

Before setting up the instrument, start degassing water for eluent to remove  $O_2$  and  $CO_2$ .

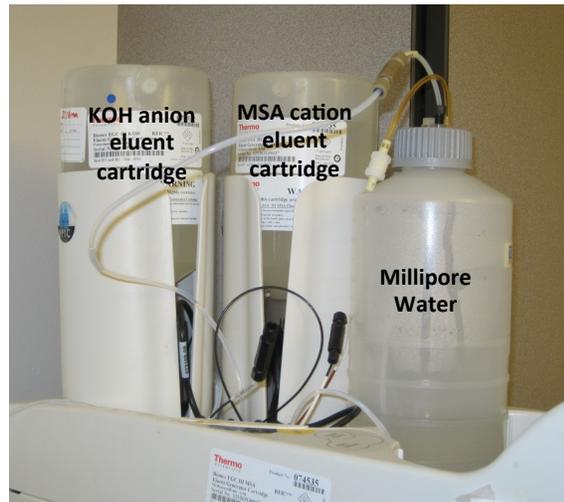
1. Fill a 2L eluent bottle with Millipore DI water.
2. Purge with  $N_2$  gas at the  $N_2$  purging station in W104:
  - a. Put a stir bar in and start stirring.
  - b. Connect the glass bubbler as shown and turn on the gas to  $100\text{ mL min}^{-1}$ , bubbling for about an hour.



## Basic Parts



Anion set-up



Eluents

## Setting up the instrument:

### If the column does not need to be switched:

1. Prime the line:
  - a. Check the waste container. Change to a new one if you are running new stuff.
  - b. Open waste – bottom left black knob, unscrew a few turns
  - c. On the instrument screen, touch the “Prime” button on left side (under Pump category).
  - d. Make sure there are no bubbles in the clear line on the left side of instrument.
  - e. Prime for 5-10 minutes. If the pump is not properly primed, it won't operate correctly.
  - f. Press the “Off” button on the instrument screen.
  - g. Close the waste valve.
2. Equilibrate the system
  - a. Once all of the lines are connected, set the suppressor current to about 123 mA in Detector Settings.
  - b. Watch the back pressure to make sure it doesn't start varying wildly. If it does, you may want to try priming the pump for a few minutes and then switching back.
  - c. Run the system for a few hours to allow it to equilibrate. Conductivity should be below 1  $\mu$ S and backpressure should be stable.

### If you need to switch to anion mode:

1. Change the column:
  - a. Remove “Eluent in” line (unscrew) on top of suppressor (this reduced background noise). This line connects to the top of the column.
  - b. Remove the guard column at the top.
  - c. Remove caps from ends of the anion column and put on the cation columns.
  - d. Remove the column and replace with the anion column and guard column, snapping them into the brackets. Be careful while doing this, holding the heating mount from behind while inserting the column, otherwise it may short circuit (whining sound).
  - e. Don't screw in the lines yet.
2. Change the suppressor:
  - a. Remove the “Regen out” line (clear) at the top of the cation suppressor.
  - b. Remove “Cell in” line from the conductivity cell (line has label on white sheath).
    - i. The “Regen in” line on the suppressor connects to “Cell out”.
    - ii. The “Eluent out” line on the suppressor connects to “Cell in”.
  - c. Remove the “Cell out” line from the conductivity cell (unscrew the small part).
  - d. Transfer caps from the anion suppressor (ASRS) to the cation suppressor. (The anion suppressor has a  $\text{CO}_3^{2-}$  removal device on top.)
  - e. Unscrew the power connection (thick black cord) and disconnect pins.
  - f. Remove the cation suppressor: lift up, then out—it sits on brackets 
  - g. Screw the anion suppressor power cord in.
  - h. Mount the anion suppressor unit on the brackets.
3. Switch over the regen line:
  - a. From the far top left corner of the panel, unscrew the black “to pump/damper” line from the green “to pump/damper” line and screw in the loose line with blue tape labeled KOH to the green line.
  - b. Cap off the black “to pump/damper” line.

unscrew here

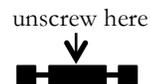


4. Change the eluent generator cartridge from MSA to KOH
  - a. On top of the instrument, look for the red line connect to “Degas Eluent Out” line (black).
  - b. Switch the MSA “Degas Eluent Out” with KOH “Degas Eluent Out”, switch caps.
  - c. Switch the clear “Regen In” line from the cartridge on the bottom of the MSA solution tank over to the KOH tank. Switch the cap.
  - d. Remove the cap from the top of the KOH tank to allow air exchange. Replace the clear cap on the MSA tank to prevent evaporation.
5. On the computer:
  - a. Software: Chromeleon (on desktop)
    - i. Click the Browser tab.
    - ii. View: Default Panel tabset.
    - iii. Use Ctrl+tab to switch between views.
    - iv. In [Panel Tabset 3], ICS-2100 System with Dual Eluent Generators-IC-2100-HAMLAB1 tab:
      - Unclick “connected” box in ICS-2100 System box in center above graph. (This allows you to control instruments from the touch screen.)
6. Prime the line:
  - a. Check the waste container. Change to a new one if you are running new stuff.
  - b. Open waste – bottom left black knob, unscrew a few turns
  - c. On the instrument screen, touch the “Prime” button on left side (under Pump category).
  - d. Make sure there are no bubbles in the clear line on the left side of instrument.
  - e. Prime for 5-10 minutes. If the pump is not properly primed, it won’t operate correctly.
  - f. Press the “Off” button on the instrument screen.
  - g. Close the waste valve.
7. Back on the computer:
  - a. Click “connect” in the system box.
  - b. Place a beaker under the line that connects to the guard column.
  - c. Click “Startup” next to “Connect”. (If the line doesn’t drip, the waste valve is still open.)
  - d. Under ICS-2100 Eluent Generator, click EG Settings.
    - i. Set the Target Concentration based on your program (20mM for Anion Std program, 10mM for AS19 program).
    - ii. Click OK
  - e. Check the pH of solution dripping into the beaker with a pH strip. Make sure it’s basic.
8. Connect lines
  - a. Connect the guard column. Push up on the column as you screw it in. Make sure this is quite tight, it tends to be a problem spot. Dry and check for leaking. Collect eluent from the top of the column (flush for a few seconds).
  - b. Connect the top of the column to “Eluent in” on the suppressor. Make sure the pressure does not exceed 3000 psi.
  - c. Connect the column to the suppressor.
    - i. Connect column to “Eluent in” on suppressor and collect eluent from “Eluent out” on the suppressor, checking the back pressure.

- ii. Attach to “Cell in” on conductivity cell (eluent should be coming out of “Cell out’ on conductivity cell.)
    - iii. Attach “Regen In” on suppressor to “Cell out” on conductivity cell (eluent should come out of “Regen Out” on suppressor). Check back pressure.
    - iv. Connect to “Regen Out” on suppressor. Collect eluent and check the back pressure.
  - d. Connect the rest of the lines, checking for leaks and making sure the back pressure doesn’t escalate dramatically.
- 9. Equilibrate the system
  - a. Once all of the lines are connected, set the suppressor current to about 123 mA in Detector Settings.
  - b. Watch the back pressure to make sure it doesn’t start varying wildly. If it does, you may want to try priming the pump for a few minutes and then switching back.
  - c. Run the system for a few hours to allow it to equilibrate. Conductivity should be below 1  $\mu\text{S}$  and backpressure should be stable.

If you need to switch to cation mode:

1. Change the column:
  - a. Remove “Eluent in” line (unscrew) on top of suppressor (this reduced background noise). This line connects to the top of the column.
  - b. Remove the guard column at the top.
  - c. Remove caps from ends of the cation column and put on the anion columns.
  - d. Remove the column and replace with the anion column and guard column, snapping them into the brackets. Be careful while doing this, holding the heating mount from behind while inserting the column, otherwise it may short circuit (whining sound).
  - e. Don’t screw in the lines yet.
2. Change the suppressor:
  - a. Remove the “Regen out” line (clear) at the top of the anion suppressor.
  - b. Remove “Cell in” line from the conductivity cell (line has label on white sheath).
    - i. The “Regen in” line on the suppressor connects to “Cell out”.
    - ii. The “Eluent out” line on the suppressor connects to “Cell in”.
  - c. Remove the “Cell out” line from the conductivity cell (unscrew the small part).
  - d. Transfer caps from the cation suppressor (CSRS) to the anion suppressor. (The anion suppressor has a  $\text{CO}_3^{2-}$  removal device on top.)
  - e. Unscrew the power connection (thick black cord) and disconnect pins.
  - f. Remove the anion suppressor: lift up, then out—it sits on brackets
  - g. Screw the cation suppressor power cord in.
  - h. Mount the cation suppressor unit on the brackets.
3. Switch over the regen line:
  - a. From the far top left corner of the panel, unscrew the black “to pump/damper” line from the green “to pump/damper” line and screw in the MSA line to the green line.
  - b. Cap off the black “to pump/damper” line.
4. Change the eluent generator cartridge from KOH to MSA
  - a. On top of the instrument, look for the red line connecting to “Degas Eluent Out” line (black).
  - b. Switch the KOH “Degas Eluent Out” with the MSA “Degas Eluent Out”, switch caps.



- c. Switch the clear “Regen In” line from the KOH cartridge on the bottom of the solution tank over to the MSA tank. Switch the cap.
  - d. Remove the cap from the top of the MSA tank to allow air exchange. Replace the clear cap on the KOH tank to prevent evaporation.
5. On the computer:
  - a. Software: Chromeleon (on desktop)
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6. Prime the line:
  - a. Check the waste container. Change to a new one if you are running new stuff.
  - b. Open waste – bottom left black knob, unscrew a few turns
  - c. On the instrument screen, touch the “Prime” button on left side (under Pump category).
  - d. Make sure there are no bubbles in the clear line on the left side of instrument.
  - e. Prime for 5-20 minutes depending on how long the instrument has been sitting. If the pump is not properly primed, it won’t operate correctly.
  - f. Press the “Off” button on the instrument screen.
  - g. Close the waste valve.
7. Back on the computer:
  - a. Click “connect” in the system box.
  - b. Place a beaker under the line that connects to the guard column.
  - c. Click “Startup” next to “Connect”. (If the line doesn’t drip, the waste valve is still open.)
  - d. Under ICS-2100 Eluent Generator, click EG Settings.
    - i. Make sure eluent 2 (MSA) is selected. Set the Target Concentration based on your program. ~15mM.
    - ii. Click OK
  - e. Check the pH of solution dripping into the beaker with a pH strip. Make sure it’s acidic.
8. Connect lines
  - a. Connect the guard column. Push up on the column as you screw it in. Make sure this is quite tight, it tends to be a problem spot. Dry and check for leaking. Collect eluent from the top of the column (flush for a few seconds).
  - b. Connect the top of the column to “Eluent in” on the suppressor. Make sure the pressure does not exceed 3000 psi.
  - c. Connect the column to the suppressor.
    - i. Connect column to “Eluent in” on suppressor and collect eluent from “Eluent out” on the suppressor, checking the back pressure.
    - ii. Attach to “Cell in” on conductivity cell (eluent should be coming out of “Cell out” on conductivity cell.)
    - iii. Attach “Regen In” on suppressor to “Cell out” on conductivity cell (eluent should come out of “Regen Out” on suppressor). Check back pressure.

- iv. Connect to “Regen Out” on suppressor. Collect eluent and check the back pressure.
  - d. Connect the rest of the lines, checking for leaks and making sure the back pressure doesn’t escalate dramatically.
- 9. Equilibrate the system
  - a. Once all of the lines are connected, set the suppressor current to about 123 mA in Detector Settings.
  - b. Watch the back pressure to make sure it doesn’t start varying wildly. If it does, you may want to try priming the pump for a few minutes and then switching back.
  - c. Run the system for a few hours to allow it to equilibrate. Conductivity should be below 1  $\mu$ S and backpressure should be stable.

**Setting up an automated run:**

1. Copy-paste a sequence from a previous run and edit to suit your needs.
2. In the main panel tabset, select, “Batch > Run”

PLEASE TURN OFF THE COMPUTER AND MONITOR WHEN THE RUN IS FINISHED AND CLEAN ALL VIALS AND CAPS FOR REUSE.

**Common problems and troubleshooting:**

If there appear to be connection problems:

1. Click on the Server Monitor icon on the desktop.
2. Server Monitor will display a small window that should state “Chromeleon Server is working”.
3. To establish a connection:
  - a. Open “Server configuration” icon on desktop
  - b. Click the computer icon: “Connect”
  - c. Exit.

If that doesn’t work, try this:

- a. In Server Monitor, check to make sure the serial number (62696) is displayed. If not displayed, make sure a blue USB drive is inserted at the back of the computer.
- b. Then click “Stop” and then “Start” in the Server Monitor.

If the computer is not powered on or connected:

4. Log in using the following username and password  
Username: hamlabadmin  
Password: jayhamlabgroup14
5. To establish a connection:
  - a. Open “Server configuration” icon on desktop
  - b. Click the computer icon: “Connect”
  - c. Exit.