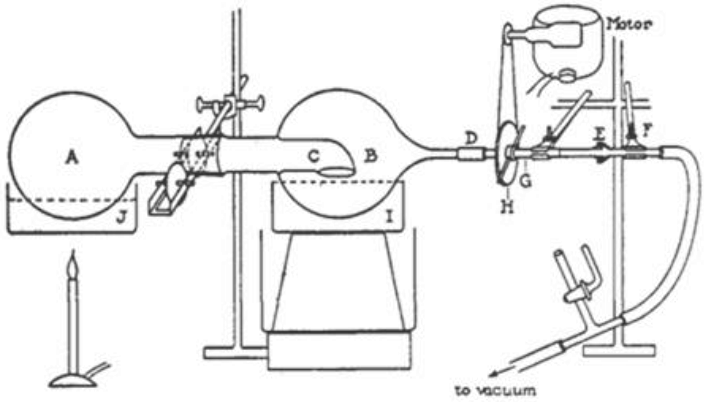
Rotary Evaporators

updated 2022-07

Versatile Laboratory Concentration Device. L. C. Craig, J. D. Gregory, and Werner Hausmann, Rockefeller Institute for Medical Research, New York, N. Y.

IN BOTH chromatography and countercurrent distribution the problem of rapid quantitative recovery of solute from relatively large volumes of dilute solution is encountered. The apparatus shown schematically in the diagram overcomes many of the difficulties.



The solution to be concentrated is placed in a round-bottomed flask, *A*. *B* is a bulb which is at least as large as or larger than *A* and has an inlet tube, *C*, whose width and opening are not smaller than the standard taper connecting *A* and *C*. The other opening in *B* is a 7-mm. glass tube which is located opposite and

Fleetwood, North Dakota Agricultural College, Fargo, N. D.

SOME procedures for the preparation of standard potassium permanganate (*1*, *2*) state that the solution is to be filtered into the reagent bottle. Filtering of most mixtures without the aid of suction or pressure is a waste of time, yet no suggestion is given to aid in following the procedures. If the mouths of reagent bottles were large, or if all laboratories were equipped with bell jars large enough to cover bottles of various sizes, the process would be simple. Thought was given to the construction of a simple, inexpensive device which would be applicable.

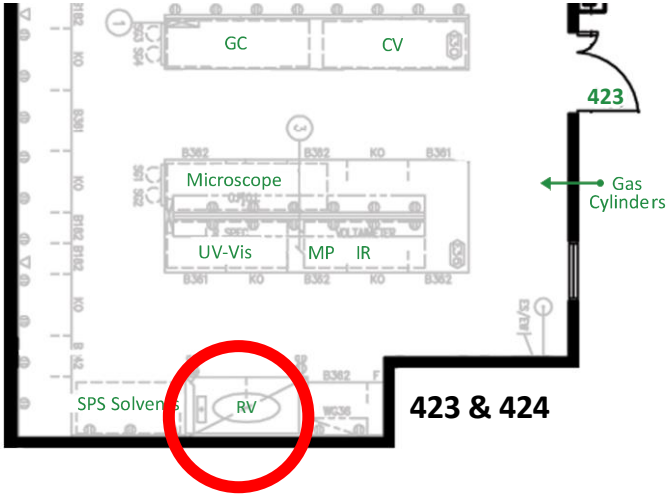
The filter device illustrated was constructed of borosilicate glass tubing, a borosilicate glass crucible with fritted disk, and two rubber stoppers. A fritted disk may be used instead of the sintered-glass crucible. This size of apparatus may be used for filtering solutions into reagent bottles with mouth openings of 1 to 5 cm. Changing the dimensions of various parts will give devices of different sizes and capacities. The principles employed by Rothman (*3*) may be used to construct a filter device for filtering into reagent bottles, but such a device would be more susceptible to breakage than the one illustrated.

The device is attached to a suction line containing a 3-way stopcock which can be used as a vent to stop filtration, and to isolate the system from the pump while venting it. The lower stopper is set on the reagent bottle and at the same time the tube leading to the solution to be filtered is placed in the solution to the required depth. The suction line is opened by closing the vent on the stopcock and pressure on the bottom stopper seals the glass-to-rubber junction.

The formation of a vacuum within the system causes the solution to feed automatically. Once filtering has begun, the system

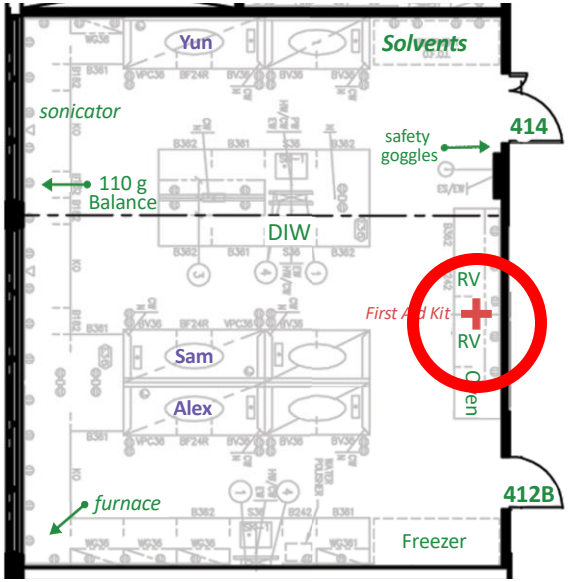
Aaron Wegener & Katherine Wang

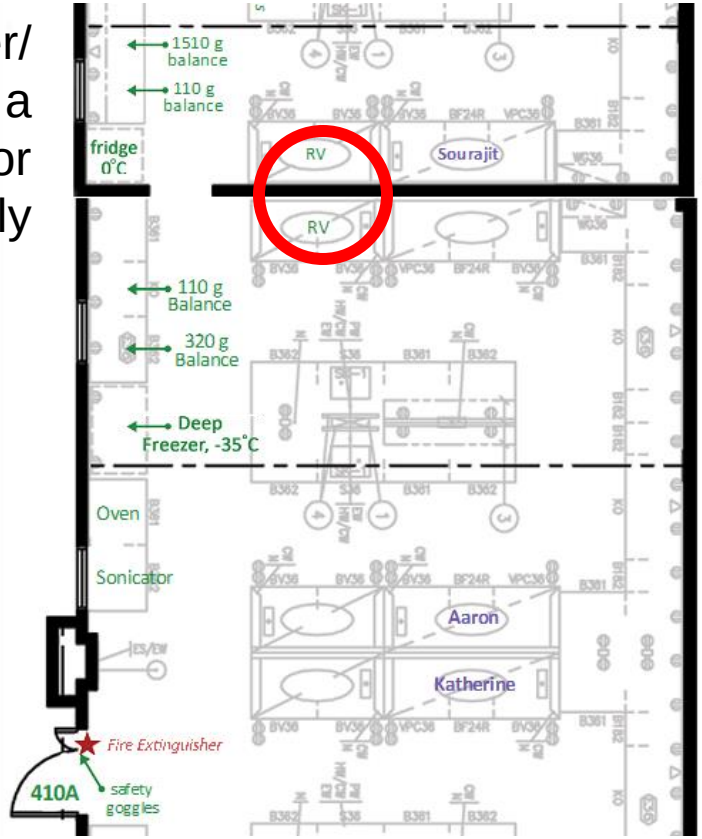
Rotavaps



1 × in the RMD423 fume hood, coiled condensers at 2 °C for general purposes, base trap for acidic mixtures and a liquid nitrogen trap.

2 × in RMD409/410 with cold finger/ immersion chillers –30 (–40 °C on a good day). Both are in fume hoods for smelly, volatile, and potentially explosive stuffs.





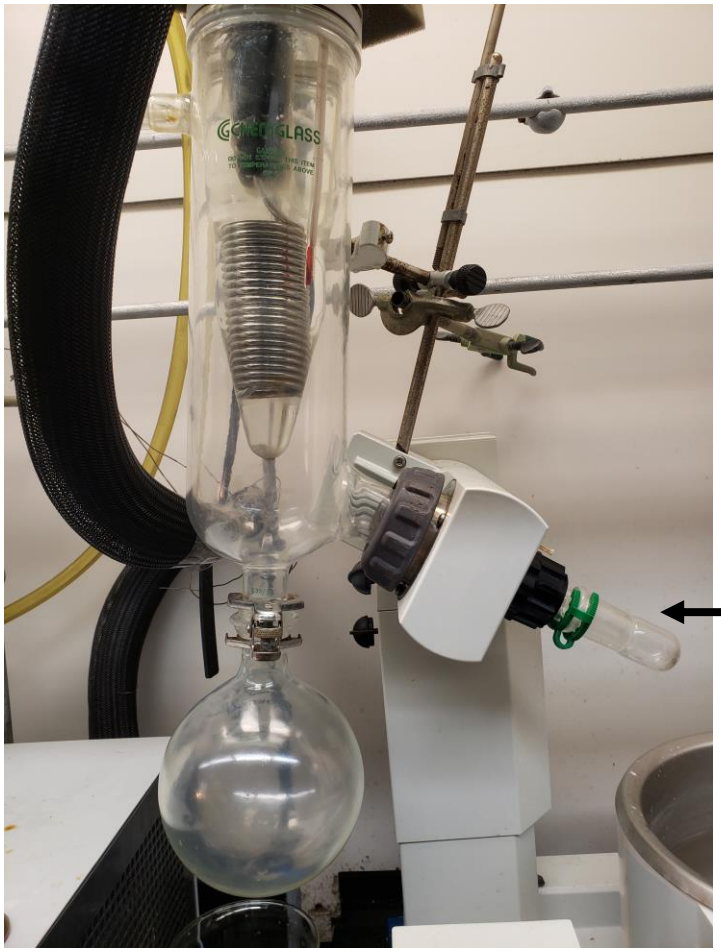
2 × in RMD414 with coiled condensers at 2 °C for general purposes.
- One has a base trap for acidic mixtures and a liquid nitrogen trap.

Rotavap Anatomy

Rotavap operation

Procedurally uncomplicated:

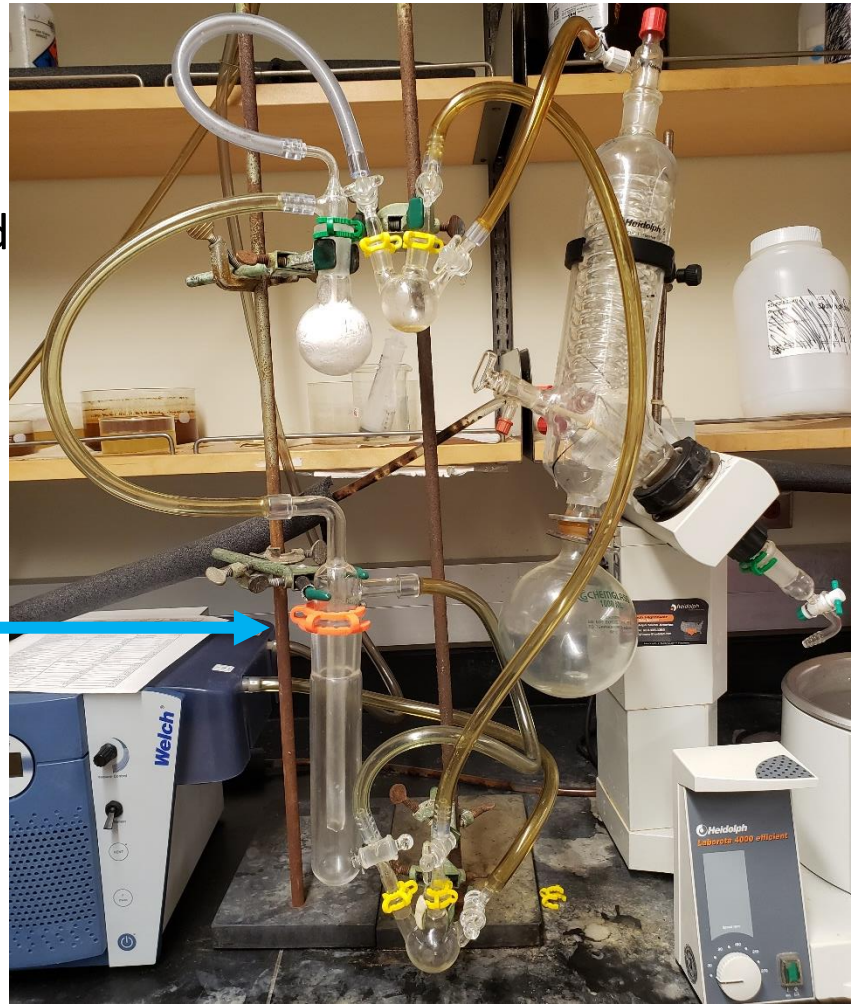
(1) Attach flask (with bump trap)
(2) Lower flask halfway into heating bath (set to 40 °C)
(3) Set the flask to rotate at a moderate speed
(4) Slowly reduce vacuum to appropriate range (1-2 drops per second*
(5) Reverse (1-4), dispose of collected solvents.



Rotavaping Acidic Samples

- A base trap removes acid from vapors before reaching the pump
- Contained on a separate line of tubing, it requires that the corresponding flow of gas is diverted using the central 3-neck flask(s)

Make sure to use a liquid nitrogen trap when evaporating acidic samples



Precautions and troubleshootings

(1) In case of solvent spills in the water bath, please change the water, clean it with soap, and then let it dry, or at least inform Aaron or Katherine. Do not be ashamed, accidents happen. Be responsible or the baths may corrode.
(2) If you break any of the parts, please inform Katherine or Aaron so that they can try to fix the problem
(3) Please make sure that you are in the lab or around when you are evaporating solvents
(4) Please remember to turn off the water bath heater if you are the last one leaving the lab.
(5) If you rotavap or smell some odorous compound, or see some solid depositing on the condenser, simply clean the condenser by rotavaping 200 mL of clean acetone and then clean the collecting flask with some extra acetone. If that does not work, let Aaron or Katherine know.