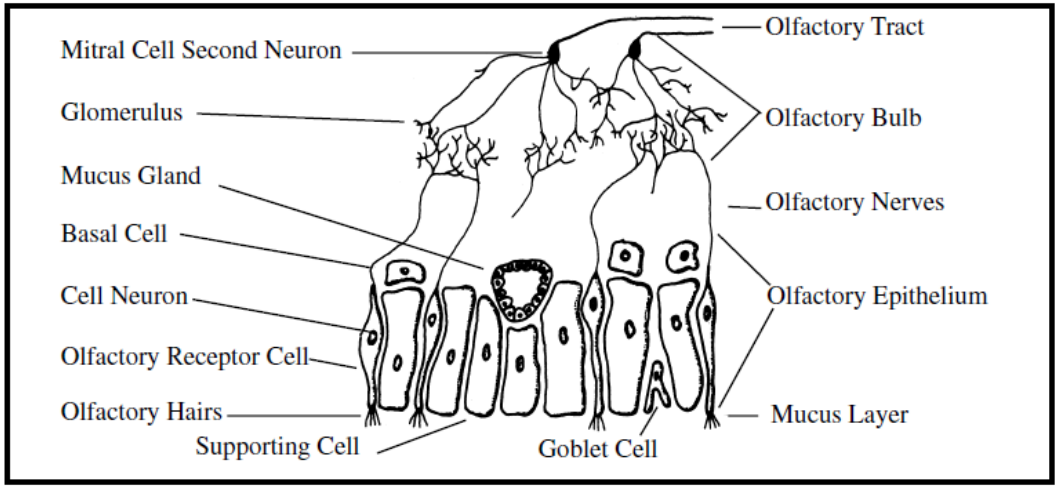
Smelly compounds



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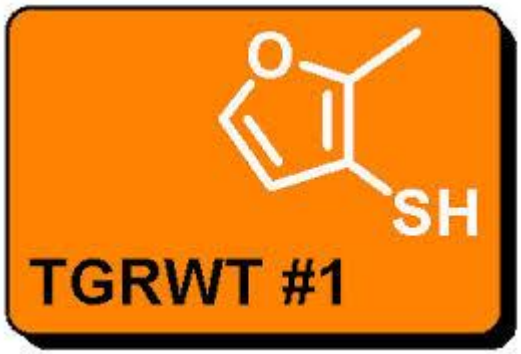
Smell

-The reason why we are so good at sensing small volatile stinking molecules and especially thiols is because humans are scavenger animals – and dead corpses rapidly expels these compounds.

-Small thiols have a odor threshold in the ppb orders of magnitude – a more than 100 times lower odor threshold than small amines

Primary odor of beef



Odor of coffee

- Thiol smell can also be associated with something good ☺

Bad smelling thiol containing food

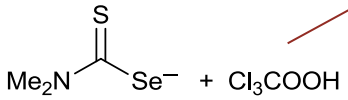
-Several food products that we can consume contain a variety of the worst smelling volatile compounds for instance: *Jackfruit* which contains several different small thiols. *Surströmninger* contains more than 50 different small amines and thiols.

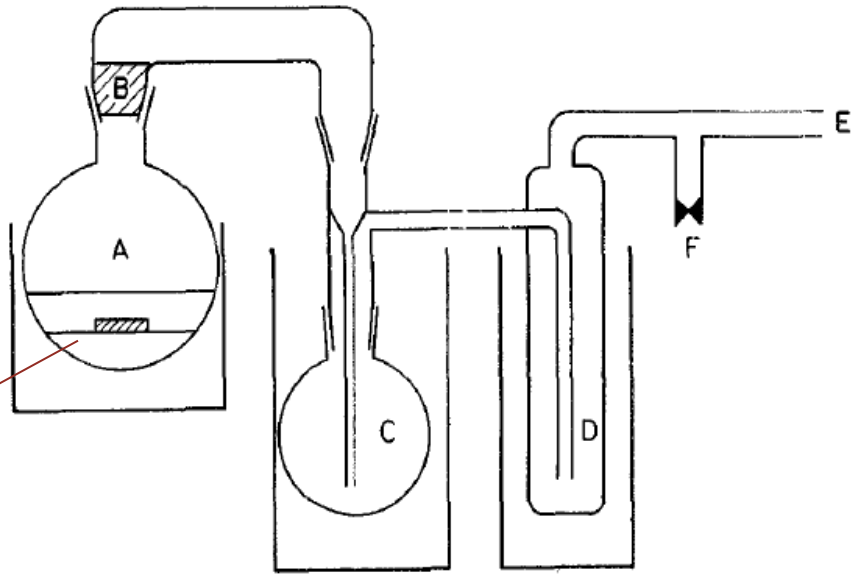
-Some individuals experience anosmia (smell blind ness) for one or more odors; however seldomly thiols!

Handling avoiding exposure of smelling compounds

- Seal your reactions from surroundings if possible
- Never let your gloves get outside the fume hood
- Keep the front of the hood down at all times
- Aim for minimal turbulence at the front of the hood
- Leave used equipment for several hours in the hood
- Place all used equipment in a hypochlorite/Deconex (or RBS) bath preferably over-night. Converts sulfur compounds, amines and carboxylic acids into non-smelly material.

Generating extremely volatile and smelly compounds

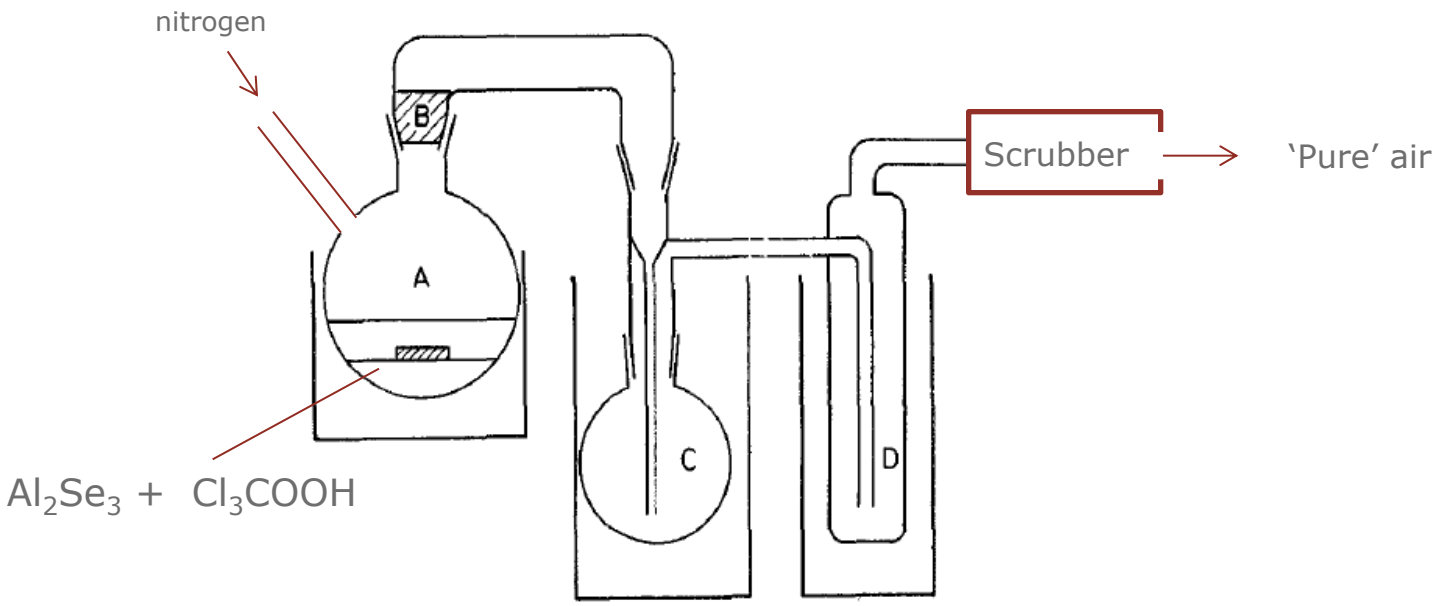




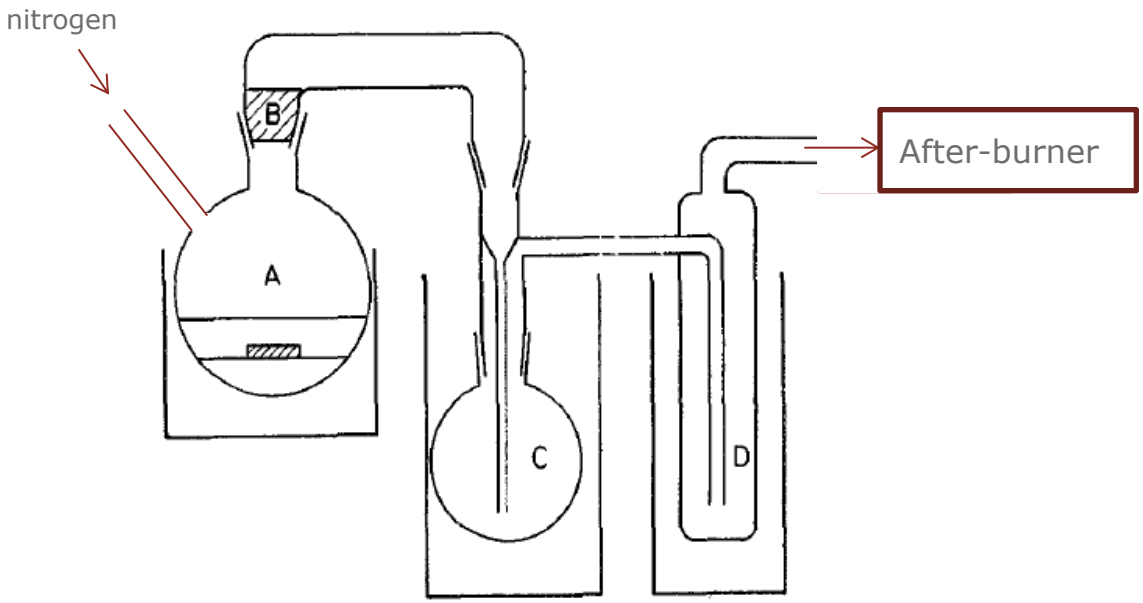
A: reaction flask
B: cotton wool plug
C: freezing trap
D: freezing trap
E: connection to pump
F: leak valve

Figure. A Convenient Apparatus for the Generation of Carbon Selenide Sulfide.

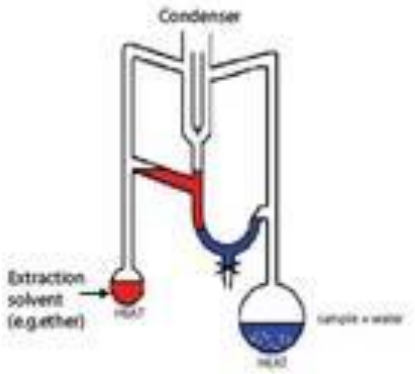
Another setup - for generation of hydrogen selenide



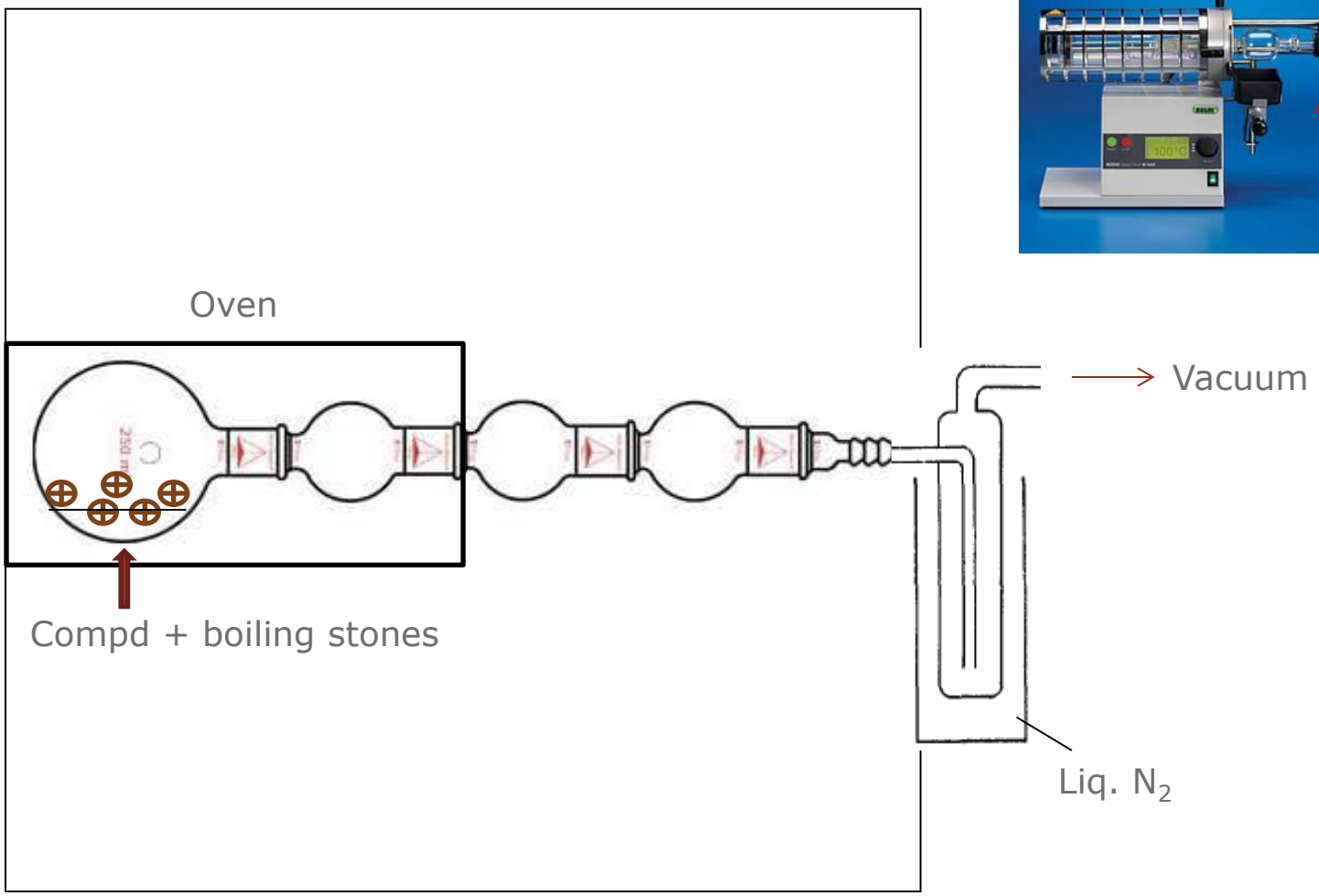
Flamable phosphines



Lickens-Nickerson apparatus for synthesis of stock solutions of volatile (smelly) compounds



Kugelrohr of smelly compounds – omitting the use of the 'stirring tower' - avoiding trouble with surroundings



Smell rating of organosulfur and organoselenium compounds

- Methanethiol boils at 6 ºC and methaneselenol at 26 ºC – probably the worst smelling compounds at all

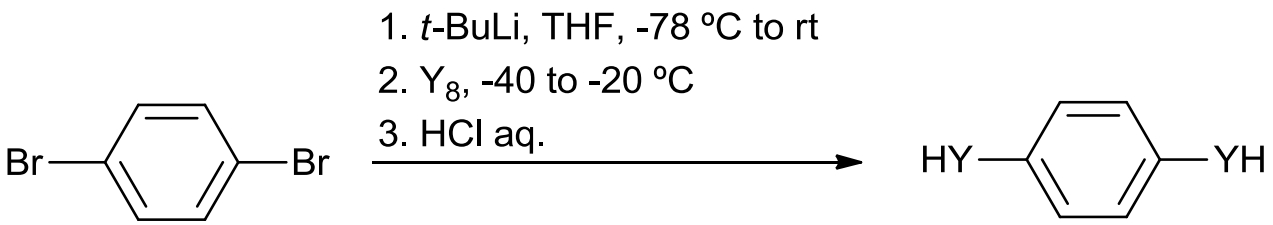
- In general divalent organoselenium selenium smell (even) worse than their corresponding sulfur analogues

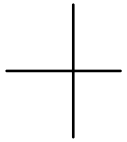
- Inside a group of divalent organochalcogen compounds the ranking is: RYH>RYYR>>RYR

- RR'Y=O compounds do not smell at all (too low vapour pressure)

- The Y=O unit rapidly forms upon bleach treatment

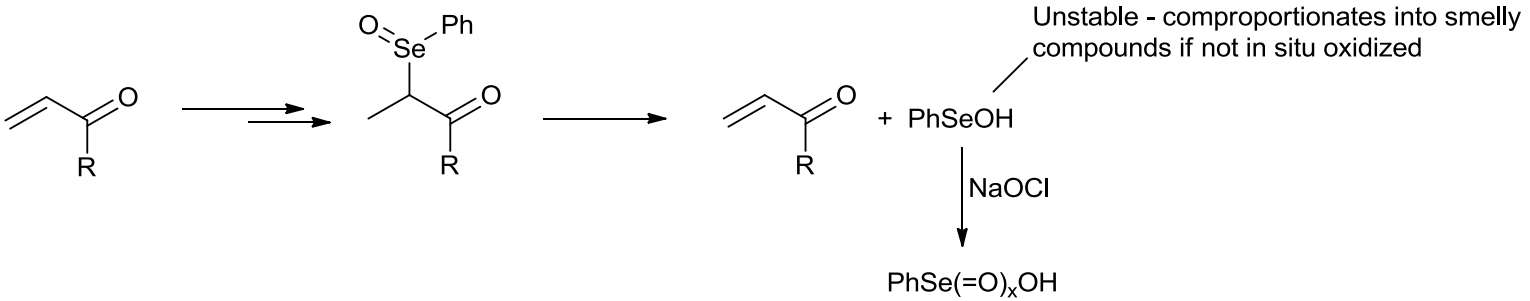
Example of a smelly incident if t-BuLi is not titrated prior to use for generation of arylchalcogenates





is produced if *t*-BuLi is not properly titrated!

Liberation of benzeneselenenic acid via cycloelimination as de-masking of α,β-unsaturated keto compounds



Final remarks

-The key element in working with smelly compounds is to keep the chemistry isolated with minimal exposure to the surroundings

-Working with smelly compounds gives good practice in working properly with less smelly chemistry

-Getting confronted with release of smelly compounds gives a reminder how often you are exposed to chemical vapors not noticing it