

## Always

- Pay attention. Many cases of experimental failure are repercussions resulting from inattention, or from leaving the lab while a reaction is underway.
- Be prepared. When you start an experiment, the clock starts ticking. Make sure everything is ready beforehand.
- Monitor regularly. Many students do not track their experiment closely enough.
- When washing with aqueous bicarbonate, vent the separatory funnel **often** to prevent pressure buildup from evolving carbon dioxide.
- Wash the organic layer with brine last.
- Copy or print the entire journal article, not just the pages you need.
- Allow compounds from the refrigerator to warm to RT before opening them.
- Cospot your reaction on TLC.
- Check to make sure your starting compounds are pure.
- Store intermediates in the refrigerator or freezer.
- Use tared flasks.
- Stir reactions vigorously.
- TLC a reaction as soon as it is begun.
- Keep your rotovap bump trap clean.
- Break the vacuum before turning off the vacuum source.
- Put a flask under your separatory funnel before pouring anything into it.
- Use a funnel.
- Check to make sure your flask is clamped **firmly** before spinning the rotary evaporator.
- Titrate n-BuLi prior to using.

## Never

- Leave your experiment
- Put your compound under high vacuum unless you know it won't evaporate.
- Throw away any fractions from a column before you have an NMR of your product.
- Throw away the aqueous layer of an extraction before you have an NMR of your product.
- Pour neat compound- use a pipette.
- Fill round-bottom flasks more than half full-(reactions, distillations, and rotoevaporation)
- Heat a closed system without venting.

## Try to

- Save a sample of the starting material when running a reaction for the first time.
- Save a sample of the crude product when doing column chromatography.
- Work up the reaction immediately after quenching it.
- Notice if your reaction is becoming hot unexpectedly during any step, and cool the flask with an ice bath.
- Maintain a homogeneous solution.
- Maintain the correct temperature
- Maintain stirring
- If a solid crashes out of solvent at any point, filter it and analyze the solid and the filtrate.
- If the compound is not volatile, put it on a high vacuum line for 10-20 minutes after rotoevaporation (and before NMR) to remove residual solvent.
- Designate a notebook for literature search information. Record the date, the search parameters, what references were found, and which ones you looked up.

Source: <http://chem.chem.rochester.edu/~nvd/tipsall.html>

Helpful hints:

1. It helps to pierce the septa only with thin needles (gauge 19, 20) whenever possible. Always put the sure-seal bottles under positive pressure of dry Ar when drawing stuff from them.
2. I use a transparent polyethylene chemical-resistant tape to re-seal the septa crown cap. I cut a 1×1 in square of the tape and affix it over the crown to cover the septa that was pierced and I compress the tape with a thumb to squeeze out air channels. (I replace the tape square with a fresh one whenever I use the bottle.) Then I put the red plastic screw cap on the taped crown and parafilm it around with double-folded parafilm strip. (The parafilm is doubled for better mechanical durability, it is stretch-wrapped and thumb compressed to seal-up tightly.) The parafilming around the bottle red cap is not overly important – but the taping the pierced septa is crucial. A suitable solvent-resistant polyethylene tape is available from VWR (cat# 11211-934).
3. Avoid commercial unstabilized anhydrous ether solvents because they don't store well - buy the stabilized ones. In medicinal chemistry a trace of BHT is much lesser problem than peroxides. (If one does a very sensitive chemistry where BHT interferes he should not be buying anhydrous solvents anyway but distill his ether solvents from a benzophenone ketyl still)
4. Don't buy LDA or LiHMDS because these reagents are made very easily, freshly before use - and the quality of their commercial solutions is quite atrocious. Strong bases in THF do not store well. Buy hydrocarbon solutions of NaHMDS and KHMDS. Grignards in THF are usually fine.
5. BuLi and sec-BuLi solutions in hydrocarbon are stable at RT; the air and moisture is the problem. The same goes for many commercial Grignard reagents. Don't put stuff in fridge that does not have to be refrigerated – temperature changes cause pressure changes in the bottle and moisture condensation problem. Also, Grignards tend to crystallize in the fridge and are hard to re-dissolve afterwards. A cabinet under hood is where I store most of my organometallics.

Source: <http://orgprepdaily.wordpress.com/2007/05/21/on-air-sensitive-reagents-and-anhydrous-solvent-storage/>