

V. Frequently Asked Questions: Material Procurement and Handling Safety

1. What are some other commonly used hydrogels?

PEGDA (poly ethylene glycol diacrylate) [10,12], MAA (Methacrylic acid) [7, 14] are other common hydrogels. They follow similar fabrication processes. Please consult staff members if you want to experiment with different hydrogels.

2. Any other photo-initiators?

See [15,16] for other photo-initiators.

DMPA(2,2-Dimethoxy-2-phenylacetophenone) is in the given example. It is not water soluble and requires other solvents or persist agitation to dissolve. It has strong absorption around 250 and 340nm. Typical concentration is in 2-5%.

LAP (Lithium phenyl-2,4,6-trimethylbenzoylphosphinate) is a water soluble photo-initiator. It has higher efficiency and typically the concentration is (0.1 to 1%). The absorption peaks at 370nm and below 340nm. It can be slightly polymerized under visible light (<420nm too).

Iguacure is another popular photoinitiator. It has various lines with different absorption peaks and handling requirements.

3. Where can I buy these materials?

Sigma-aldrich and Polysciences carry many materials.

4. How to get materials or processed approved in the lab?

To bring a new chemical in SNF, you need to file a PROM request (Process or Materials Review Request). The key points are: MSDS (Material safety data sheets), rationale for bringing the new materials supported by references, storage procedure (where and how much you will store in SNF), and detailed step-by-step experiment procedures. Safety is most important and you need to understand the hazards and how to protect yourself and lab mates.

<https://snf.stanford.edu/SNF/materials-and-chemicals/specmat-requests>

To bring a new chemical in NSIL, you need to file a SOP request (Standard Operating Procedures). The key points are: MSDS (Material safety data sheets), rationale for bringing the new materials supported by references, storage procedure (where and how much you will store in NSIL), and detailed step-by-step experiment procedures. Safety is most important and you need to understand the hazards and how to protect yourself and lab mates.

<https://snf.stanford.edu/SNF/materials-and-chemicals/specmat-requests>

5. What chemicals are NOT allowed in the lab?

Any materials that have not been approved with PROM or SOP (see question 4). Powders are not allowed to be stored or used anywhere in SNF. Therefore, liquid monomers are recommended over powders. For chemicals that come in powder form such as photoinitiators, they can only be stored and handled in NSIL or wafer-saw room.

6. You How do I store materials into the lab?

After being approved by the staff members, obtain a yellow label from the staff member. On the yellow label, clearly write the full chemical name of the materials, hazards, and contact information (Figure 1).

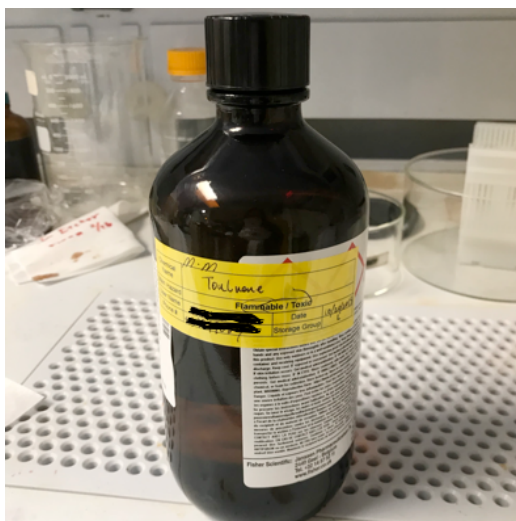


Figure 1. Yellow label on chemical bottles. Write down full chemical name, storage group, hazards, dates and contact information.

7. What if I bring the materials into the lab without storing them in SNF/NSIL?

You are still required to get a yellow label for your materials. This helps staff member track chemicals used in the lab and promotes safety in general.

8. How do I transport materials between labs?

You need to carry your materials in a secondary container (Figure 2). You can get one from the staff member.

To bring chemicals in SNF, chemicals need to be transported through the maintenance area. You first leave the chemicals in the maintenance area next to the door, and then fully gowned up in SNF and bring it to the experiment setup locations. This is true even if you are going to exfab.



Figure 2. Chemicals in a secondary container bucket.

9. How do I dispose materials and waste?

To dispose liquid waste, use a waste disposal bottle and attach a white label to it (Figure 3a). On the white label, clearly state the full chemical names of the materials and their ratios, hazards, and contact information. White labels and waste disposal bottles can be found in the maintenance area behind furnaces in SNF, or in NSIL.

To dispose solid waste, use a zip lock bag (Figure 3c).

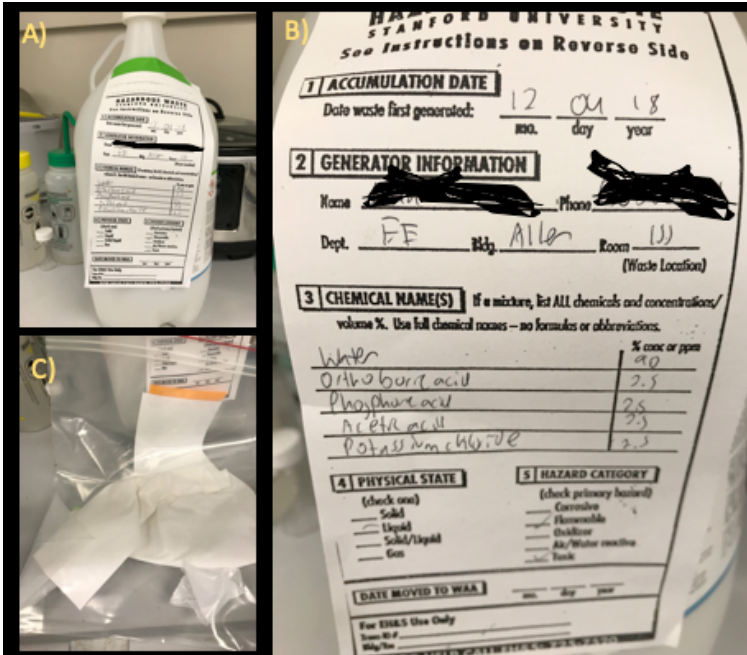


Figure 3. A) waste disposal bottle with white label attached. B) white label with contact info, chemical name and ratio, and hazards clearly filled. C) zip-lock bag for solid-waste disposal.

10. What else is needed?

You may need a blue card when handling chemicals that are in an open container (such as in beaker or vials). Clearly label the chemical name, ratio, hazards, and contact information. If the chemicals will be left in the lab for extended period of time, also label the expected disposal time. The chemicals unattended over a day without labeled disposal time may be disposed by the staff member without notice.

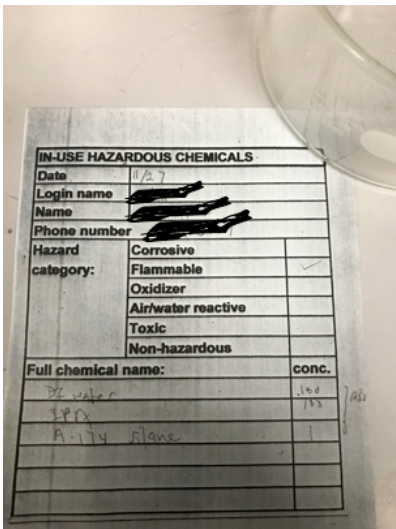


Figure 4. Sample blue card with contact info, chemical name and ratio, and hazards. Note 2 mistakes on this card: the chemical names are abbreviated instead of fully written out, and the chemical concentrations do not add up to 100%.