

**Standard Operating Procedure
Methyl Methacrylate**

1. Procedure/Hazardous Material:

Laboratory use of Methyl Methacrylate (MMA)

2. Department: Campus wide

3. Revision Date: March 2012

4. Special Notifications:

User must obtain permission from the PI prior to performing this protocol for the first time (see SBU Chemical Hygiene Plan EH&S Policy 4-2, ([http://www.asa.stonybrook.edu/asa/asafoms/EHSD0221/\\$FILE/EHSD0221.pdf](http://www.asa.stonybrook.edu/asa/asafoms/EHSD0221/$FILE/EHSD0221.pdf)). Read the material safety data sheets (MSDSs) for the chemicals used in this protocol. Understand the health and safety hazards involved.

5. Hazard Description:

- MMA is flammable, irritant, organic peroxide, explosion by shock or friction, reproductive toxin, and sensitizer. **OSHA PEL:** TWA 100 ppm (410 mg/m³); **IDLH:** 1000 ppm (410 mg/m³); **Odor threshold:** 0.08 ppm (0.3 mg/m³)
- Benzoyl peroxide is considered a highly hazardous chemical. Irritation eyes, skin, mucous membrane; sensitization dermatitis. **OSHA PEL:** TWA 5 mg/m³ **IDLH:** 1500 mg/m³

6. Engineering Controls:

Mixing of the solutions must be done in the fume hood. Ensure that the fume hood is working properly before beginning procedure.

7. Personal Protective Equipment:

1. Wear disposable nitrile gloves during all steps. Nitrile gloves only provide short term protection to small splashes. If the gloves get contaminated with MMA, take them off as soon as possible and wash your hands. Dispose of the contaminated gloves and put on a new pair. If you expect more than incidental exposure to MMA, you must wear supported polyvinyl alcohol (PVA) gloves.
2. Wear chemical safety goggles when working with MMA.

8. Storage Requirements:

MMA/Benzoyl peroxide needs to be stored in a Laboratory Safe refrigerator at 4⁰ C to keep it from polymerizing.

9. Handling Precautions/Conditions:

Seal scintillation vials with parafilm before placing them in the waterbath, or put waterbath in the fume hood, to ensure no vapors are released during heating.

10. Emergency Procedures:

Immediately clean up any spilled solutions. All paper towels or material used to clean up spill must be disposed of as hazardous waste:

- Put all materials in a plastic bag and seal with tape.
- Label with orange Hazardous Waste sticker provided by EH&S.
- This bag must be kept in a fire safe "step can" until disposal.
- Dispose of material during normal hazardous waste pick ups.

If spill is larger than 20ml or a respirator may be required to enter the lab, contact University Police at 911 immediately and request the HAZMAT Team. Refer to EH&S Policy 2-2 *Laboratory Emergency Spill Plan* for additional information.

11. Decontamination:

Clean up spills (solid or liquid) immediately.

12. Waste Disposal:

1. Paper towels with an incidental amount of MMA can be disposed of as regular trash.
2. If you turn over the bottle that contained the new MMA and nothing drips out, it is "empty" and does not need to be triple rinsed. The empty bottle can be disposed of as regular trash or saved for MMA waste.
3. Any solvent used to clean MMA glassware must be saved & disposed of as hazardous waste, following all of the hazardous waste labeling, etc. requirements.
4. There should be no "left over" MMA/Benzoyl peroxide solution. All the solution should be allowed to polymerize. The solid acrylic can be disposed of as regular trash. Any acrylic (polymerized MMA) shavings can be disposed of as regular trash.
5. If the waste MMA/Benzoyl peroxide needs to be stored in a refrigerator at 4⁰ C to keep it from polymerizing (unit must be "lab safe" for flammables), the refrigerator must be in the lab where the waste is generated.

13. Laboratory Specific Procedures:

Lab Director:

Room:

Procedures for using MMA:

1. MMA waste needs to be disposed in a controlled manner. To this end, we will store MMA waste in a **disposable HDPE plastic container** (500ml, air tight) and let it polymerize by keeping it in a water bath at a temperature of 37C. If necessary, some catalyst (benzoyl peroxide) can be added to accelerate polymerization. The polymerization process will be monitored regularly. **Do not store any MMA waste in a glass bottle.**
2. MMA solution used at any point **should not exceed 250ml**. Consequently, you have to limit yourself to **smaller sample sizes** (e.g.: 15-20 mice bones or 10-15 rat bones) and repeat this process several times if you have a larger sample size.
3. **MMA without the catalyst**, Benzoyl peroxide (Solution I in our Embedding Protocol) can be stored in a glass bottle (specific for MMA), however needs to be **picked up by EH&S within a week**. Call EH&S (2-6410) for pickup. All bottles of MMA must be dated when made.
4. **One person at a time**. At no point in time, should be more than one person use MMA embedding procedures in the lab. The second person can start the process only when **embedding is complete and the waste generated is polymerized**. This way we can limit the amount of MMA waste generated in the lab.
5. **No other chemicals should be mixed** with the MMA-Benzoyl peroxide solution waste container.
6. At all times, MMA in glass vials/MMA waste container/hot water bath must be in the **fume hood** with the sash closed. Always put MMA containers in a secondary container (plastic tray) large enough to hold entire contents of liquid being stored.
7. Any person working with MMA **must be trained** by senior graduate student/lab technician on how to perform the embedding protocol and the disposal of waste.
8. You need to **have permission** from the PI/Lab Manager before you start your protocol.

14. Additional References

- *Prudent Practices* http://www.nap.edu/catalog.php?record_id=12654 (read it online for free)
Prudent Practices for Safety in Laboratories provides step-by-step planning procedures for handling, storage, and disposal of chemicals. Organized around a recommended workflow protocol for experiments, the book offers prudent practices designed to promote safety and it includes practical information on assessing hazards, managing chemicals, disposing of wastes, and more.
- "Methacrylate Esters Safe Handling Manual" from Lucite.