

Safe Operating Procedure (SOP) for 3-(Trimethoxysilyl)propyl methacrylate

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Product name: 3-(Trimethoxysilyl)propyl methacrylate

Synonym name: methacryloxy propyl trimethoxysilane (MPTS)

Formula: $C_{10}H_{20}O_5Si$

Molecular weight: 248.35 g/mol

Flammable liquids (Category 4)

Precautionary statement(s) for safe use:

- Keep MPTS away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
- Wear protective gloves/ eye protection/ face protection when using MPTS.
- In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
- Dispose of contents/ container to an approved waste disposal plant.
- Use personal protective equipment. Avoid breathing vapours, mist or gas. Remove all sources of ignition. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
- Prevent further leakage or spillage if safe to do so. Do not let product enter drains.
- Keep container tightly closed in a dry and well-ventilated place (use Parafilm to ensure it's sealed).
- MPTS is moisture sensitive. Handle and store under inert gas.
- Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in

accordance with applicable laws and good laboratory practices. Wash and dry hands.

- Avoid strong oxidizing agents, strong acids, and strong bases.

Application:

A diluted solution of MPTS:acetone will be used as an adhesion promoter between SU-8 (as the photoresist) and a base layer metal like Titanium, Chromium, Gold, or Aluminum; or between SU-8 and an oxide layer like Silicon Nitride, Silicon Oxide, or Titanium Oxide.

After applying the solution on the surface of samples (either by soaking the sample in the solution or spin coating one to two droplet(S)), they will be left under fume extractor and will be allowed to dry. Due to the dilution of MPTS with Acetone, it will dry out in a couple of minutes.

Disposal considerations (waste treatment method):

This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Offer surplus and non-recyclable solutions to a licensed disposal company.

Where to use?

MPTS must be used under a fume hood or a fume extractor. Considering the fact that a diluted solution of MTPS:Acetone is needed (%8 solution), it will be used in the Etching Room in G2N lab, where there are both a fume hood and a fume extractor.

PPE required:

To work with MPTS, one must take all personal precautionary equipment, listed as below:

- 1- MPTS contaminated gloves are not allowed to be used for other purposes, so an extra set of gloves must be worn only for MPTS process, and should be carefully taken out and thrown away in the chemical bin (during the COVID-19 pandemic, this means a third set of gloves is required).
- 2- Goggles, and face shield must be used while MPTS is being used.
- 3- Apparel should be used to ensure no spillage on the user.

How to use?

In case of using MPTS under the fume hood, sample will be placed in a glass PetriDish, two droplets of the diluted MPTS:Acetone will be applied on the sample, and the PetriDish will be covered by its lid and left for drying out (which takes almost 5 minutes). Then the lid will be meticulously removed in the fume hood to assure that all vapours made by MPTS is ventilated completely.

Contaminated wipes will be thrown away in the chemical bin only. The PetriDish will be dedicated to this process and will be labeled and kept in a safe place (in a box).

In case of using MPTS through spin coating process, less than 2 droplets will be used for samples as big as 400 mm² so minimal exposure of MPTS to tools is done. The fume extractor will be placed right on top of spin coater to ensure ventilation of MPTS vapours is done correctly and completely. Contaminated wipes will be thrown away in the chemical bin only.