SOP for Poly(vinyl alcohol) (PVA) molding with SU-8

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SAFETY: Wear gloves and other appropriate protective apparel. Do not store with strong oxidizing agents. Store at a temperature lower than 38 deg.C.

Waste disposal: Do not dispose of liquid waste into sewer, liquid waste should be dried in a fumehood and disposed as solid waste.

**Exposure controls**

Use with adequate ventilation.

**Personal protective equipment**

Hand protection : Wear chemical resistant impervious gloves.

Eye protection: Safety glasses with side shields or goggles are recommended. Eye wash stations are recommended for the work area.

Skin and body protection: Wear impervious clothing and shoes. Safety showers are recommended for the work area.

Respiratory protection: Provide sufficient general and/or local exhaust.

SOP:

1. Place the molding master in a petridish.
2. Pour PVA solution into the petridish and let the master fully immersed in PVA.
3. Put the petridish with master and PVA into the BCB vacuum oven. Open vacuum valve, keep temperature at room temperature, degas the mixture for 0.5h.
4. Increase the temperature setting to 50 deg.C.
5. Let the water in the PVA solution evaporate for ~20h.
6. Purge the BCB vacuum oven with N2, cool the molded PVA to room temperature naturally.
7. Remove the master mold.
8. Flip over the negative PVA mold, pour SU-8 2020 into the petridish with the PVA mold.
9. Put the petridish into the BCB vacuum oven. Open vacuum valve, set the temperature to 60 deg.C, wait for 3-5h, increase the temperature to 95 deg.C, wait for 8-12h (or over night).
10. Purge the BCB vacuum oven with N2. Keep the petridish in the oven at 95 deg.C. Load a plastic or metal plate on top of the melted SU-8, then load a heavy weight (1-2kg) on the plate. Open the vacuum valve again and wait for 0.5-1h.
11. Cool down the compressed system to room temperature naturally. Remove the weight and plate.
12. Use MA6 mask aligner to do a flood exposure (300s) on the SU-8 in the petridish.
13. Manually separate the SU-8 and PDMS pieces.
14. Observe the structures in the SU-8 piece using optical microscope.
15. Put the SU-8 piece in the BCB vacuum oven, keep temperature at 150 deg.C, bake the SU-8 piece for 1h (no vacuum applied).