

# PVA Protocol

## Materials

- poly(vinyl alcohol) (PVA): Sigma-Aldrich cat. #36103, average Mw 146,000-186,000, 87-89% hydrolyzed
- distilled H<sub>2</sub>O (d H<sub>2</sub>O)
- Ethanol, USP 200 proof
- graduated cylinder (500mL)
- stir bar
- 1L glass bottle
- hot/stir plate
- Polydimethylsiloxane (PDMS) mold
- graduated cylinder (50mL)
- oven
- scotch tape

## Steps

1. 4.0% PVA Solution Preparation
  - a. Weigh 40g of PVA in a suitable dish.
  - b. Measure 400mL of dH<sub>2</sub>O in a graduated cylinder. Pour dH<sub>2</sub>O into a 1L glass bottle containing a stir bar.
  - c. Measure 300mL of Ethanol in a graduated cylinder. Pour Ethanol into the 1L glass bottle containing the dH<sub>2</sub>O and stir bar.
  - d. Place the dH<sub>2</sub>O/ethanol mixture on the hot/stir plate. Start stirring and heating the solution.
  - e. Slowly pour the PVA from step a. into the 1L bottle with dH<sub>2</sub>O/ethanol mixture, while it is stirring.
  - f. Stir and heat the solution until all the PVA is dissolved. Heat until boiling to ensure all the PVA dissolves.
  - g. Add an additional 300 mL of ethanol to the dissolved PVA solution and stir and re-heat until the solution is clear.
2. 8" PDMS with Pattern
  - a. Ensure table surface that will be used is flat and level.
  - b. Transfer 40mL of warm 4.0% PVA (approximately 40°C) to a container suitable for pouring from.
  - c. Slowly pour the 4.0% PVA onto the 8" PDMS mold, starting in the center of the mold and working towards the outside in a circular motion.

- d. With a suitable object (pipette tip, spatula, etc.), spread the 4.0% PVA solution so that it covers the entire patterned area.
  - e. Allow the template to sit at room temperature for approximately 30 min.
  - f. If any air bubbles are visible in the PVA, pop them with a sharp metal object, such as a needle or tweezer tip.
  - g. Place the PDMS with PVA in a level, 45°C oven until dry. Drying will take approximately 3-5 hours, depending on oven. PVA is dry when not tacky to the touch and has a frosty appearance.
3. PVA Removal from PDMS
- a. Once PVA is dry, remove the PDMS mold from the oven.
  - b. Place a small piece of scotch tape on the PVA before it is removed from the PDMS to mark the PVA side without wells.
  - c. Starting with one side, slowly peel the PVA off the PDMS using tweezers, taking care to not rip the PVA.
  - d. Store the 8" PVA templates in a cool, dry container; preferably with desiccant.
4. Cleaning PDMS Molds
- a. Wash PDMS molds with warm, soapy water to remove residual PVA. Do not scrub templates with brushes or scratch pads, as this will damage the molds.
  - b. Rinse molds well with tap water, followed by distilled water, followed by ethanol.
  - c. Dry molds completely prior to pouring PVA.
  - d. Molds should be washed every 20-30 pours.