Chip Lid Molding

ENGR 1182.03
Lecture
Learning Objectives of Lab

- Expose students to a lab-on-a-chip fabrication technique utilizing polydimethylsiloxane (PDMS) to produce the lids for the acrylic chip bases.

- Introduce student to the issues concerning material safety data sheets (MSDS) and safe or appropriate handling of materials based on the information provided in an MSDS.
Chemical Safety

- Anything that you are not familiar with should be handled carefully.

- Every time a chemical is sold or shipped it must be documented by a "Material Safety Data Sheet" or MSDS.
  - Another useful reference is Sax's Dangerous Properties of Industrial Materials by Richard J. Lewis.
  - Please MSDS provided on the course website.

- In any process where chemicals are to be used, safety is the highest priority.
  - Gloves, Glasses, Coat, and Boots/close-toe shoes as appropriate.
Portion of MSDS for our Resin (Base)

<table>
<thead>
<tr>
<th>MSDS No.: 02680068</th>
<th>Revision Date: 2001/11/13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generic Description:</td>
<td>Silicone</td>
</tr>
<tr>
<td>Physical Form:</td>
<td>Liquid</td>
</tr>
<tr>
<td>Color:</td>
<td>Colorless</td>
</tr>
<tr>
<td>Odor:</td>
<td>Some odor</td>
</tr>
<tr>
<td>NFPA Profile: Health</td>
<td>0</td>
</tr>
<tr>
<td>Flammability:</td>
<td>1</td>
</tr>
<tr>
<td>Instability/Reactivity:</td>
<td>0</td>
</tr>
</tbody>
</table>

Note: NFPA = National Fire Protection Association

2. OSHA HAZARDOUS COMPONENTS

None present. This is not a hazardous material as defined in the OSHA Hazard Communication Standard.

3. EFFECTS OF OVEREXPOSURE

**Acute Effects**

**Eye:** Direct contact may cause temporary redness and discomfort.

**Skin:** No significant irritation expected from a single short-term exposure.

**Inhalation:** No significant effects expected from a single short-term exposure.

**Oral:** Low ingestion hazard in normal use.

**Prolonged/Repeated Exposure Effects**

**Skin:** No known applicable information.

**Inhalation:** No known applicable information.

**Oral:** No known applicable information.
Desiccator arrangement
Degassing Procedure

- Pay close attention to valve positions for cycling vacuum on and off.
  - Do not open the vacuum line directly to the atmosphere.
- The following four slides demonstrate the possible positions for the stopcock and the two that should not be used.
This configuration pulls air from the desiccator to the vacuum pump, creating a vacuum in the desiccator (for removing bubbles in PDMS).
This configuration releases the vacuum from the desiccator and equalizes the pressure in the desiccator with that of the atmosphere (for de-foaming or overflow prevention).
This configuration opens all three airways on the stopcock and releases the vacuum from the desiccator and the entire vacuum system. 
THE STOPCOCK SHOULD NEVER BE SET THIS WAY!!!!
This configuration releases the vacuum from the entire vacuum system, but maintains the current pressure in the desiccator. 

THE STOPCOCK SHOULD NEVER BE SET THIS WAY!!!!
Notes on Procedure

- Bubbles in syringes not too important unless excessive.

- Make sure you pour the mixture into the bottoms of the petri dishes.
  - The bottoms have the smaller diameter.

- Put group name on petri dishes and stack on leveled table specified in lab.