UCSC
MOCVD LAB - MTG. W/ CFM
PER CONTROL
- 1-GAL PYROPHORIC LIQUID
- 200 GB PYROPHORIC SOLID

1 gal = 3.78 L x 1000 = 3,780 ml / 13 OCCUPANCY

3780 ÷ 5 = 756
LARGEST CANISTER = 750 ml

MAXIMUM QT. = 5 EACH

* NOBBY'S PLAN - ON MOCVD TOOL & ONE ALD TOOL

* CONTROL AREAS
PROJECTS - ALT. 2 & 3 - SEPARATE CONTROL AREAS
- CLEANROOM AREA
- REMAINDER OF BLDG. ONE CONTROL AREA
- OTHER AREAS ARE NOT DEFINED AND NOT ACKNOWLEDGED BY CFM.

* I.D. A (N) CONTROL AREA OR H- OCCUPANCY FOR MOCVD LAB

OPTIONS
1. NEXT TO CLEANROOM
2. 3120 LEVEL (N) CONTROL AREA

* ROOM 210 OPTION IS RULED OUT

CHEMICAL LIST: 1) RECEIVED CHEM LIST FOR MOCVD TOOL
2) STILL NEED CHEM LIST FOR ALD TOOL

Jacky, Ramon P., Dean L., Bob Vitale
CFM - Chuck Hernandez
CFC 30.1 / SFM
CFC 30.1 / SFM
HCSC
ACTION ITEMS

1. AND CHEM LIST
   NOBHY

2. EVALUATE TWO OPTIONS - E) CLNRM IES/6LP & A 2ND. AREA ON LEVEL-3

3. PROVIDE EQUIPMENT OUT SHEETS SHOWING NOBHY DIMENSIONS & WEIGHTS

4. I.O. PROTECT AREAS WITH H2 WALK IES/6LP

5. I.O. EXIT CORRIDORS (FIRE RATED) IES/6LP

6. I.O. CHEM CANISTERS, SIZE AVAILABLE IES/6LP

7. PROVIDE PROVE FLOW LOGIC & GAS FLOW NOBHY RATES

8. DEFINE H2 CONSUMPTION PER WEEK, MONTH, ETC. TO SIZE DELIVERY SYSTEM & GAS CYLINDERS NOBHY REPLACEMENT FREQUENCY

9. EMERGENCY GENERATOR CURRENT CAPACITY & LOADING
<table>
<thead>
<tr>
<th>Symbolic chemical name</th>
<th>Generic chemical name</th>
<th>Chemical formula</th>
<th>State under the standard states (at 1 atm / 25°C)</th>
<th>Container to be installed at a reactor</th>
<th>Total amount of material to be present per reactor (g)</th>
<th>Click for MSDS</th>
<th>Summary of physical properties</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TMAI</td>
<td>Al(CH$_3$)$_3$</td>
<td>liquid</td>
<td>Stainless steel vacuum tight container</td>
<td>200 $\times$ 0.37 [= 75.3]</td>
<td><img src="image1" alt="Image" /></td>
<td>Pyrophoric</td>
<td>Aluminum source for III-V compound semiconductors such as AlAs, AlGaP</td>
</tr>
<tr>
<td>2</td>
<td>TMGa</td>
<td>Ga(CH$_3$)$_3$</td>
<td>liquid</td>
<td>Stainless steel vacuum tight container</td>
<td>200 $\times$ 1.1 [= 192]</td>
<td><img src="image2" alt="Image" /></td>
<td>Pyrophoric</td>
<td>Gallium source for III-V compound semiconductors such as GaAs, InGaAs</td>
</tr>
<tr>
<td>3</td>
<td>TMIn</td>
<td>In(CH$_3$)$_3$</td>
<td>solid</td>
<td>Stainless steel vacuum tight container</td>
<td>200</td>
<td><img src="image3" alt="Image" /></td>
<td>Pyrophoric</td>
<td>Indium source for III-V compound semiconductors such as GaAs, InGaAs</td>
</tr>
<tr>
<td>4</td>
<td>TBAs</td>
<td>As(C$_6$H$_5$)$_2$H$_2$</td>
<td>liquid</td>
<td>Stainless steel vacuum tight container</td>
<td>400 $\times$ 1.35 [= 526]</td>
<td><img src="image4" alt="Image" /></td>
<td>Toxic, pyrophoric</td>
<td>Arsenic source for III-V compound semiconductors such as GaAs, InGaAs</td>
</tr>
<tr>
<td>5</td>
<td>TBP</td>
<td>P(C$_6$H$_5$)$_2$H$_2$</td>
<td>liquid</td>
<td>Stainless steel vacuum tight container</td>
<td>400 $\times$ 0.49 [= 506]</td>
<td><img src="image5" alt="Image" /></td>
<td>Flammable</td>
<td>Phosphorus source for III-V compound semiconductors such as GaAs, InGaAs</td>
</tr>
<tr>
<td>6</td>
<td>DEZn</td>
<td>Zn(C$_3$H$_7$)$_2$</td>
<td>liquid</td>
<td>Stainless steel vacuum tight container</td>
<td>100 $\times$ 1.92 [= 192]</td>
<td><img src="image6" alt="Image" /></td>
<td>Pyrophoric</td>
<td>Acceptor source for III-V compound semiconductors</td>
</tr>
<tr>
<td>7</td>
<td>Si$_2$H$_6$</td>
<td>Si$_2$H$_6$</td>
<td>gas</td>
<td>Standard gas cylinder</td>
<td>a lecture bottle</td>
<td><img src="image7" alt="Image" /></td>
<td>Flammable</td>
<td>Donor source for III-V compound semiconductors, 100ppm diluted in hydrogen</td>
</tr>
<tr>
<td>8</td>
<td>H$_2$</td>
<td>H$_2$</td>
<td>gas</td>
<td>Standard gas cylinder</td>
<td>$\sim$9 x 50&quot; standard cylinders with $\sim$2000psi</td>
<td><img src="image8" alt="Image" /></td>
<td>Flammable</td>
<td>Ultra high purity hydrogen will be generated from high purity hydrogen</td>
</tr>
<tr>
<td>9</td>
<td>N$_2$</td>
<td>N$_2$</td>
<td>gas</td>
<td>Standard gas cylinder</td>
<td>$\sim$9 x 50&quot; standard cylinders with $\sim$2000psi</td>
<td>n/a</td>
<td>n/a</td>
<td>Ultra high purity supplied by Baskin Engineering building</td>
</tr>
<tr>
<td>10</td>
<td>DMATi</td>
<td>[(CH$_3$)$_2$N]Ti</td>
<td>liquid</td>
<td>Stainless steel vacuum tight container</td>
<td>200</td>
<td><img src="image9" alt="Image" /></td>
<td>air sensitive</td>
<td>Titanium source for mixed oxide such as TiO$_2$ for ultra-high density solid-state memory</td>
</tr>
<tr>
<td>11</td>
<td>CpEr</td>
<td>Er(C$_5$H$_5$)$_3$</td>
<td>solid</td>
<td>Stainless steel vacuum tight container</td>
<td>200</td>
<td><img src="image10" alt="Image" /></td>
<td>Flammable</td>
<td>Er source for ErSb used for thermoelectric devices</td>
</tr>
<tr>
<td>12</td>
<td>TMSb</td>
<td>Sb(CH$_3$)$_3$</td>
<td>liquid</td>
<td>Stainless steel vacuum tight container</td>
<td>200</td>
<td><img src="image11" alt="Image" /></td>
<td>Flammable</td>
<td>Sb source for ErSb and InSb used for thermoelectric devices</td>
</tr>
</tbody>
</table>
All,

Attached is an updated projected chemical inventory from Prof Kobayashi for that lab. He listed all chemicals at levels he would like to optimally have. He is willing to discuss alternatives as needed.

Changes I see from the 5/14/07 copy are as follows:
- increase quantities from 100g to 200grams for
  #1 - trimethylaluminum
  #2 - trimethylgallium
  #3 - trimethylindium
- increase quantities from 100g to 400grams for
  #4 - tertiarybutylarsine
  #5 - tertiarybutylphosphine
  6-9 appear unchanged
- additions of the following (200g quantities)
  #10 - Tetrakis(dimethylamino)titanium
  #11 - Tris(cyclopentadienyl)erbium
  #12 - Trimethylantimonide

Let me know if you think Prof Kobayashi should be at the FM meeting tomorrow. He has another appointment but if we think it necessary he will cancel his other meeting.

regards, Bob

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