Introduction

LOL1000 and LOL2000 are enabling solutions designed for submicron lift-off processes. These materials are ideally suited for MR thin film head, gallium arsenide, and a variety of semiconductor applications.

Features

- Submicron lift-off capability
- Excellent adhesion to thin film head and semiconductor substrates
- No interfacial mixing with photoresist
- DUV flood exposure not required
- Dissolution rate optimized for controlled undercut

Baseline Process Conditions

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coat LOL</td>
<td>700–3,000Å Thickness</td>
</tr>
<tr>
<td>Softbake LOL</td>
<td>150–170°C for 5 min.</td>
</tr>
<tr>
<td>Coat Imaging Resist</td>
<td>Application specific</td>
</tr>
<tr>
<td>Softbake Imaging Resist</td>
<td>Shipley positive photoresist</td>
</tr>
<tr>
<td>Expose Imaging Resist</td>
<td>Per recommended imaging resist process</td>
</tr>
<tr>
<td>PEB</td>
<td>Optional</td>
</tr>
<tr>
<td>Develop and Undercut</td>
<td>Application specific</td>
</tr>
<tr>
<td>Lift-off with NMP</td>
<td>Shipley developer</td>
</tr>
</tbody>
</table>

Cauchy Coefficients

<table>
<thead>
<tr>
<th>n₁</th>
<th>n₂</th>
<th>n₃</th>
<th>Refractive Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5810</td>
<td>-1.84e+06</td>
<td>8.13e+13</td>
<td>1.58 @ 632.8 nm</td>
</tr>
</tbody>
</table>

Schematic Lift-off Process Flow

Coat and Softbake LOL

Coat and Softbake Imaging Resist

Expose Imaging Resist

Over develop to Undercut

Sputter

Lift-off
Dissolution Rate vs. Softbake

Thickness vs. Spin Speed

Typical TFH Process
- NiFe seed layer
- 1 µm SJR®5138 over 900Å LOL1000
- Ultratech 1700 Stepper (1 µm)
- No PEB
- MICROPPOSIT® 453 Developer

Lift-off Profile

2.00 µm Lines/Spaces

0.70 µm Lines/Spaces

Typical Submicron Process
- Ta seed layer
- 0.85 µm SPR®500-A over 900Å LOL1000
- GCA XLS i-Line Stepper (0.55 NA, 0.54σ)
- With PEB
- MICROPPOSIT® 453 Developer