**AI Technology, Inc (AIT) Develops Temporary Bonding Wax for Precision Wafer and Substrate Back-grinding and Thinning Applications**

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As devices such as cell phones, cameras, and tablets continue to shrink, there is also a big push to shrink the “thickness” of these devices, and hence, the thickness of the dies and wafers. Wafers and substrates are thinned down from as thick as 750 micron down to 25-50 micron to improve the performance and/or provide a thinner and lighter electronic device.

While back-grinding tapes are used in many applications in place of traditional wax solutions, a temporary bonding wax that can be applied to the thickness of 10 micron still provides many advantages over the thicker back-grinding tapes. This is particularly true for more aggressive processes and more fragile wafers.

Responding to this need for thinner wafers and substrates, AI Technology, Inc. (AIT) has recently developed a series of temporary wax-like media that has been proven to be useful in many of these thinning applications. Unlike traditional wax, AIT’s wax-like media provides well-defined melting points of 80ºC and 160ºC for different processing requirements and easy removal. The bonding medium can be dissolved cleanly with IPA or acetone. AIT temporary bonding media has been proven useful in all of the four primary methods for wafer thinning: mechanical grinding, chemical mechanical polishing (CMP), wet etching and atmospheric downstream plasma (ADP), and dry chemical etching (DCE).

AIT’s back-grinding liquid wax (BGL) can be spun to form 10 micron film for precision bonding with a die-shear bond strength of over 500 psi for temperatures 15ºC below the melting point. AIT provides the temporary bonding/protective wax in pre-dissolved isopropyl alcohol (IPA). The thickness of this wax film can be adjusted in the spin coating process or by diluting the wax liquid further with IPA.

One of AIT’s feature Temporary Bonding IPA-Soluble Wax Solutions, BGL7080 can be heated to 60ºC and still maintain a stable bond. Other high temperature waxes, such as BGL70160-HV and BGL7080-HV7 can maintain a relatively stable bond up to 135ºC and 150ºC respectively. These waxes can withstand exposure to high temperature up to 225ºC for shorter time periods without degradation.
Release or dismount is achieved by melting the wax at a high temperature to lower the viscosity of the wax layer significantly, thus allowing the release of the wafer or device mechanically by lifting or gentle sliding.

For high temperature waxes, IPA or other solvents must be used to swell, penetrate, soften, and dissolve the waxes. This can be done by dipping and soaking the wafer/substrate into an IPA bath. Warm IPA at 40 -60°C will accelerate this dismount mechanism.

Some examples of AIT’s temporary bonding/protective waxes are listed in the table below. AIT developed these solutions by working closely with our customers to meet their specific needs. AIT can formulate a solution that will work for your stringent requirements.

**Properties of AIT’s Back-Grinding and Thinning Wax Liquids**

<table>
<thead>
<tr>
<th>PARAMETERS</th>
<th>BGL7080</th>
<th>BGL7160-HV</th>
<th>BGL7160-HV7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Release Mechanism</td>
<td>Debonding by melt and mechanical slipping</td>
<td>Isopropyl alcohol to swell, soften, and remove the wax</td>
<td>Isopropyl alcohol to swell, soften, and remove the wax</td>
</tr>
<tr>
<td>De-Bonding Temperature</td>
<td>120°C with slipping push</td>
<td>40°C with iso-propanol</td>
<td>40°C -60°C with iso-propanol</td>
</tr>
<tr>
<td>Thickness of Temporary Bonding Layer</td>
<td>5-25 micron by spin coating</td>
<td>10 - 100 micron by spin coating or spraying</td>
<td>10 -100 micron by spin coating or spraying</td>
</tr>
<tr>
<td>Die-Shear Bond Strength (PSI)</td>
<td>&gt;500 psi</td>
<td>&gt;500 psi</td>
<td>&gt;500 psi</td>
</tr>
<tr>
<td>Operating temperature range for processing</td>
<td>20 - 60°C</td>
<td>20 - 135°C</td>
<td>20 - 150°C</td>
</tr>
<tr>
<td>Cleaning Media</td>
<td>Iso-propanol (IPA)</td>
<td>Iso-propanol (IPA)</td>
<td>Iso-propanol (IPA)</td>
</tr>
<tr>
<td>Water Jet Resistance</td>
<td>Outstanding</td>
<td>Outstanding</td>
<td>Outstanding</td>
</tr>
</tbody>
</table>

**Note:** AIT backgrinding and thinning temporary materials are free of silicones or siloxanes.
About AI Technology, Inc. (AIT):

Since pioneering the use of flexible epoxy technology for microelectronic packaging in 1985, AI Technology, Inc. (AIT) has been one of the leading forces in development and patented applications of advanced materials and adhesive solutions for electronic interconnection and packaging. AI Technology, Inc. (AIT) offers some of the most reliable adhesives and underfills for die bonding for the largest dies, stack-chip packaging with dicing die-attach film (DDAF), flip-chip bonding and underfilling and high temperature die bonding for single and multiple-chip modules for applications beyond 230°C. The company continues to provide the best adhesive solution for component and substrate bonding for both military and commercial applications. AIT’s thermal interface material solutions, including our patented phase-change thermal pads, thermal greases and gels and thermal adhesives have set many bench marks of performance and reliability for power semiconductors, modules, computers and communication electronics.

For an application analysis:  [http://www.aiotechnology.com/analysis/](http://www.aiotechnology.com/analysis/)


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