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WaferBOND® HT-10.11

Temporary Bonding Material

WaferBOND® HT-10.11 temporary bonding material enables back-end-of-line (BEOL) processing of ultrathin wafers with standard semiconductor equipment.

WaferBOND® HT-10.11 material is an organic adhesive coatings developed for temporary wafer bonding solutions for MEMS and 3-D wafer-level packaging applications. WaferBOND® HT-10.11 material enables effective bonding and support through substrate thinning and backside standard lithographic processing through utilization of effective bonding and subsequent thermal slide, chemical*, mechanical**, or laser** debonding. This material was specifically developed for thin wafer handling (TWH), through-silicon via (TSV) reveal, and redistribution layer (RDL) creation or processes up to 250°C.

*Chemical release debond method requires perforated carrier wafer

**Mechanical and laser debond methods require a compatible release material

BENEFITS

- Enables ultrathin wafer processing utilizing standard BEOL techniques and tooling
- Assists in creation of interconnects (RDL layers) after thinning
- Protect devices from chemical degradation and physical breakage
- Adhesive material can be completely removed from device wafer without damage
- Can be utilized with 4 debond methods (chemical release, thermal slide, mechanical, or laser)

MATERIAL PROPERTIES

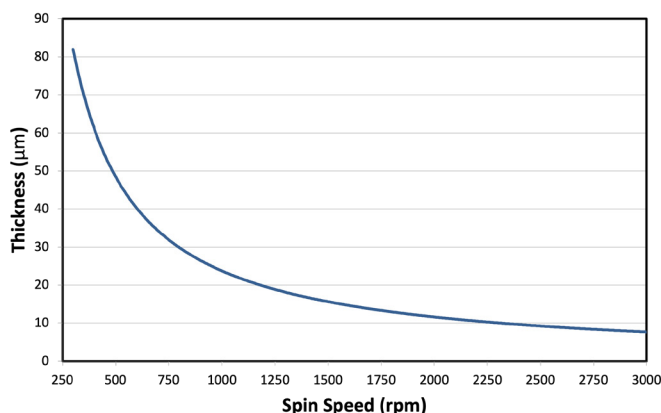
Thermal Stability, T_d

$N_2 \approx 300^\circ C$, 2% wt loss

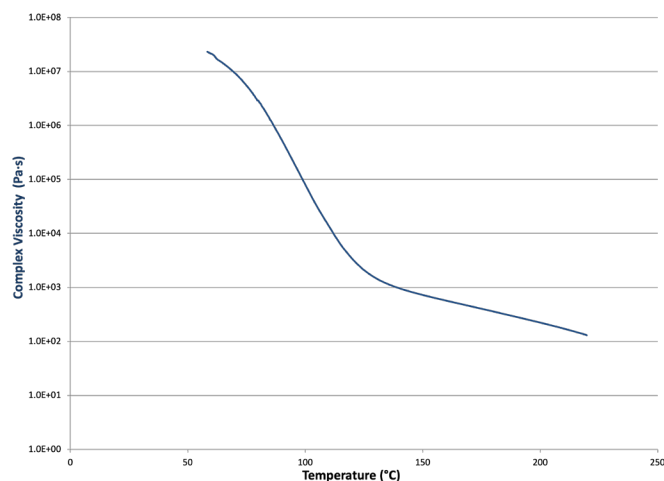
Air $\approx 295^\circ C$, 2% wt loss

Refractive Index (RI)= 1.531 average
890-1649 nm

WaferBOND® HT-10.11 Material Spin Speed Curve



WaferBOND® HT-10.11 Material Rheology



Viscosity (Brookfield) at Room Temperature (25°C)
WaferBOND® HT-10.11 material: ~1700 cP

PROCESSING Best known methods (200-mm wafers)

Spin Coat				Bake (Temp, Time) 0.5 mm Proximity		Bond, Double Platen			
Thickness	Spin (rpm)	Accel. (rpm/s)	Time (s)	Bake 1	Bake 2	Temp	Time	Vacuum	Force
20 µm	1200	500	30	120°C, 3 min	180°C, 4 min	180°C	2 min	≤ 5 mbar	3500 N
50 µm	500	500	30	120°C, 5 min	180°C, 6 min	170°C	1 min	≤ 5 mbar	2100 N

Storage Conditions

Store at room temperature (16°C to 26°C)

Chemical Release Debonding

(WaferBOND® HT-10.11 Material)

Debonding Process (Two-Bath Process)

- Bath 1: Submerge in WaferBOND® Remover material at 110°C to 130°C for 1-4 hours, or until debonded.
- Bath 2: Clean up with WaferBOND® Remover material at 70°C to 110°C for 15 min to 1 hour. Mild circulation is recommended.
- Rinse: Isopropyl alcohol (IPA)
- Dry

Note: The flash point of WaferBOND® Remover material is 77°C. Please ensure that adequate engineering controls are in place before heating WaferBOND® Remover material above this temperature.

Thermal Slide Debonding

Film Thickness 50 µm
Temp: 200°C
Velocity 3 mm/s
Force 3 lbf

Resistance to Process Chemicals

Chemistry	Bath Temp.	Time	Bond line (bonded to glass wafer)
Acetone	25°C	25 min	Noticeable edge effects
Cyclohexanone	25°C	5 min	No defects
Ethyl Lactate (EL)	25°C	30 min	No defects
Isopropanol (IPA)	25°C	30 min	No defects
PGMEA	25°C	5 min	No defects
PGME	25°C	5 min	No defects
D-limonene	25°C	10 min	No defects
N-methylpyrrolidone (NMP)	25°C	10 min	No defects
N-methylpyrrolidone (NMP)	80°C	10 min	No defects
TMAH 2.38%	80°C	30 min	No defects
HF: DI Water (1:10)	25°C	15 min	No defects
HF (49%)	25°C	20 min	No defects
HNO ₃ :H ₃ PO ₄ :HF (12:8:1)	25°C	5 min	No defects
H ₂ SO ₄ :HF (20:1)	25°C	5 min	No defects
Hydrogen Peroxide (H ₂ O ₂) (35%)	50°C	60 min	No defects
KOH (30%)	85°C	60 min	No defects

Many factors can affect a material's chemical resistance. These include, but are not limited to: exposure time, chemical concentration, extreme temperature and pressure, frequency of temperature and pressure cycling, attrition due to abrasive particles, and the type of mechanical stress imposed.

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