brewer science

Wax Replacement with Temporary Wafer Bonding Technology

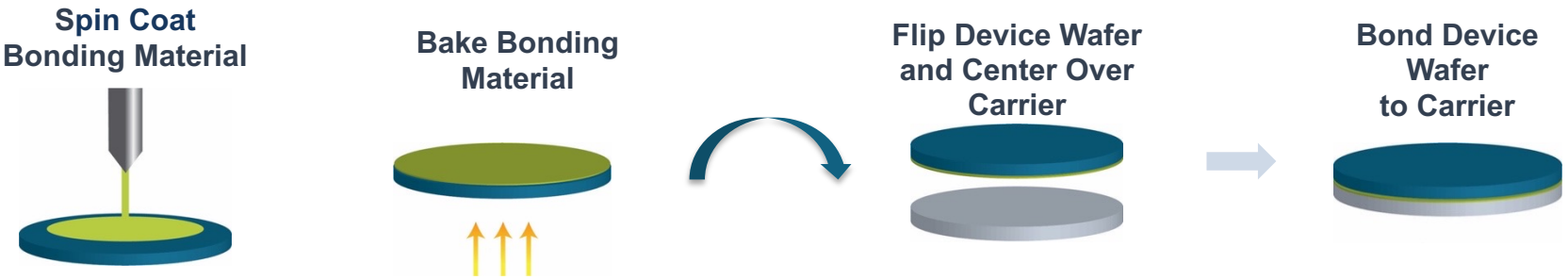
BrewerBOND® 230 Material

The New Standard In Thermal Slide Technology

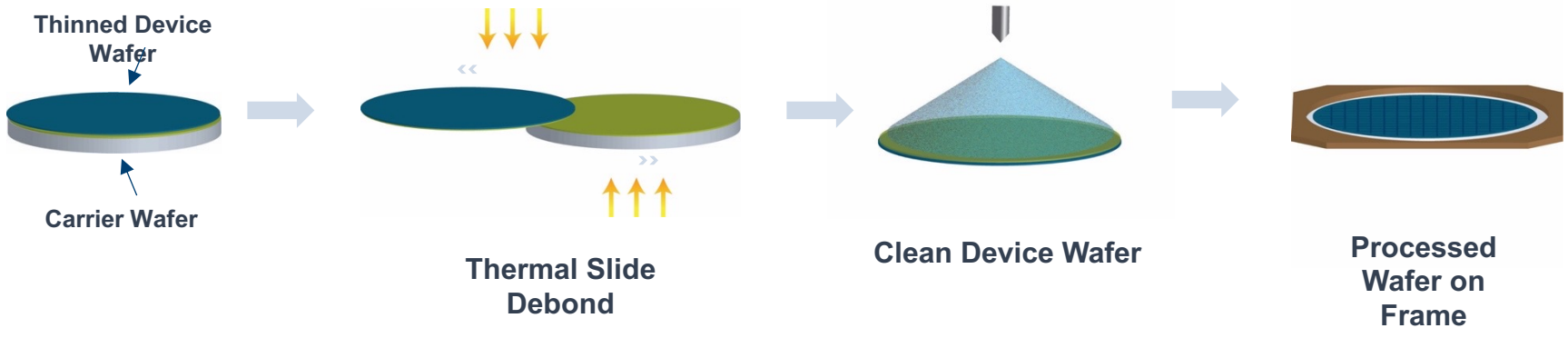
- Lower cost of ownership through increased throughput, decreased rework, wider process capabilities, and maximized device yield.
- Improved via uniformity and increased die yield across substrate.
- Rheology designed for maximum device support during extreme thermal backside processing.
- Ability to safely handle thinned device wafers through debonding and cleaning.

Thermal Slide Debonding Technology

TEMPORARY BONDING PROCESS



THERMAL SLIDE DEBONDING PROCESS



Competitive Advantages

Properties	Wax	BrewerBOND® 230 Material
Thickness Range	~ 10 µm - 35 µm	**20 µm – 110 µm**
Coating Throughput	Multi-coat process	**Single-coat process**
Bonding Temperature Range	95°C - 110°C	**100°C-130°C**
Debonding Temperature Range	95°C - 110°C	**150°C – 200°C**
Thermal Stability Temperature Range	< 120°C	**≤ 250°C**

- Brewer Science's temporary bonding materials are specifically designed for thermal slide processes enabling downstream thermal stability ≤ 200°C.
- Ease of use in process, ultimate manufacturing quality, and leading-edge technical support.
- State-of-the-art developmental design offering process support of device wafers through downstream processing.
- Compatible with downstream vacuum process steps.

Known Application Attributes

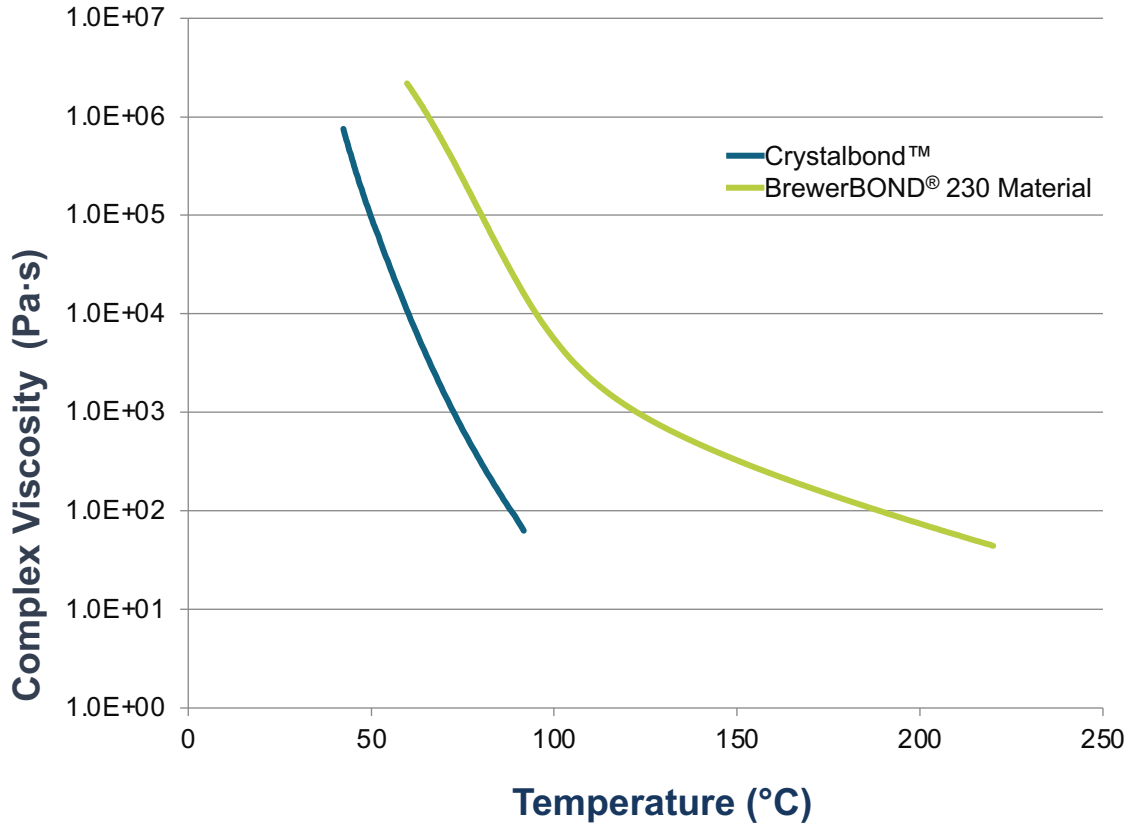
Focus of This Work—Thermal Slide Debond:

- Low-temperature, low-stress thermal slide debonding using GaAs, SiC, epoxy mold compound, silicon, GaN, glass, and sapphire

Bonding Material & Use Range	Material Type
BrewerBOND® 230 (100°C – 250°C)	High-Flow, Non-Polar Resin Blend

Material Attributes

Rheology | Complex Viscosity Comparison



Characterization:

- Viscosity (Brookfield) at 25°C:
  BrewerBOND® 230 Material: ~ 2600 cP
- T_d (TGA*)
  *IPC-TM-650 2.4.24.6 (2% loss)
  BrewerBOND® 230 Material: ~285°C
- T_g (DSC)
  BrewerBOND® 230 Material: ~25°C

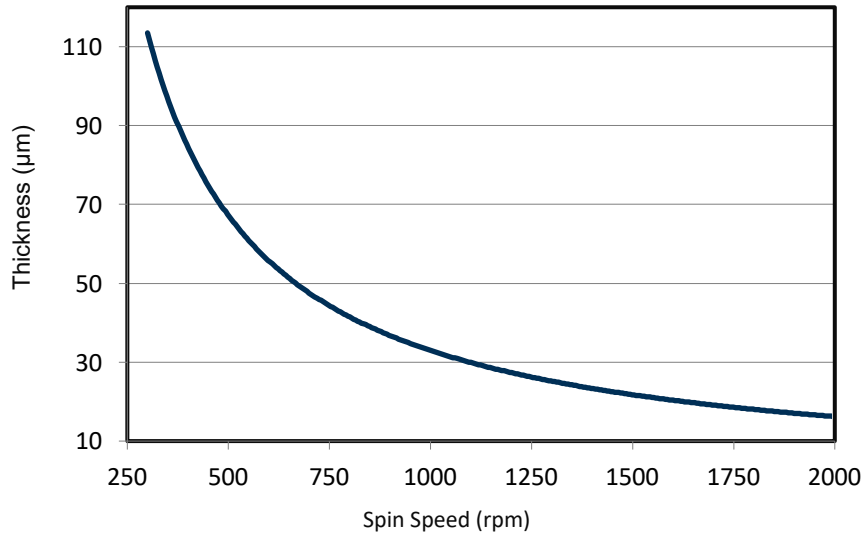
Spin Speed Curves and Material Bakes

Spin Coating & Baking

Coating Parameters	
Dispense	Static on wafer center
Spin Speed	See spin speed curve below
Acceleration	500 rpm/s
Spin Time	30 s

Thickness	Proximity Bakes at 0.5 mm		
	Bake 1	Bake 2	Bake 3
20 µm	120°C, 1 min	220°C, 2 min	N/A
50 µm	80°C, 3 min	180°C, 3 min	220°C, 3 min
100 µm	80°C, 5 min	180°C, 5 min	220°C, 10 min

Spin Speed Curve



Note: Spin speed curve was generated on 200-mm wafers and utilized a 5-mm edge exclusion.

Bond and Debond | Processing Windows

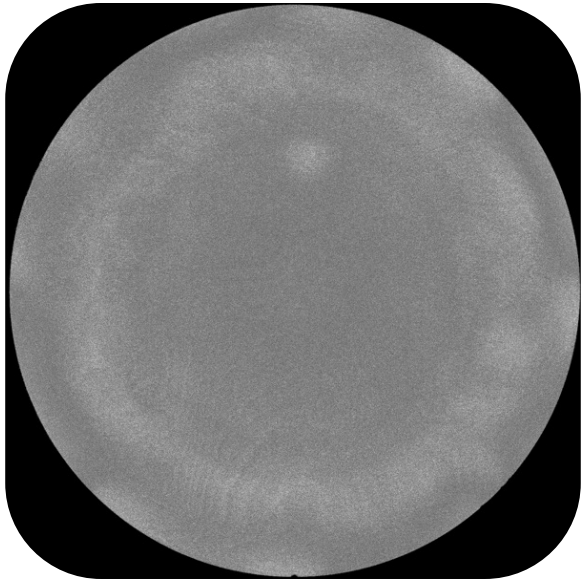
Bonding Process	BrewerBOND® 230 Material
Bond Temperature	100˚C – 130˚C
Bond Time	2 min
Vacuum	≤ 5 mbar
Force	500 N – 2500 N

Thermal Slide Debonding Process	BrewerBOND® 230 Material
Temperature	150˚C -190˚C
Force	2-4 lbf
Speed	2-3 mm/s

Note: Parameters may need optimization depending on the topography and structure of the device wafers.

CSAM Images After Heat Treatment

BrewerBOND® 230 material



200°C for 60 minutes at in a N_2 oven

BrewerBOND® 230 material showed no signs of voiding after thermal processing.

Summary

- Low-stress material for high-stress device applications
- Broader thickness range in a single coat: up to ~110 µm
- Cleans faster and with less solvent than historic materials
- Broad temperature range for thermal separation: 150°C to 200°C
- Survives standard backend-of-line thermal processing

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Where innovation takes flight!℠

THANK YOU