Record-breaking Mechanical Strength in AlN History!

High strength AlN Substrate

◆Feature

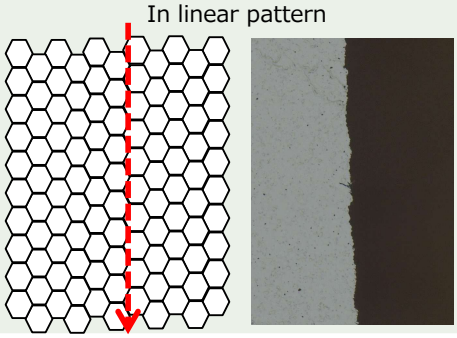
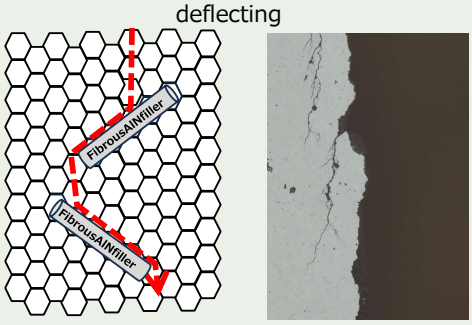
◆Size/Thickness

Size : □4.5inch
Thickness : 0.2～1.2mm

		Conditions	Unit	AlN Substrate (Competitive Product)	U-MAP products AlN Substrate		
					170W/m・K	200W/m・K	230W/m・K (UD)
Density			g/m^3	3.3	3.3	3.3	-
Mechanical Properties	Bending Strength	Three point	MPa	350	350	300	-
	Elastic Modulus		GPa	320	320	320	-
	Vickers Hardness		HV	1100	850	850	-
	Fracture Toughness	①IF ②SEPB	MPa・m$^{1/2}$	3.0①	5.5②	5.5②	5.5②
Thermal Properties	Coefficient of Thermal Expansion	25-300℃	10^{-6} /K	5.2	4.8	4.8	-
	Thermal Conductivity	25℃	W/m・K	180	170	200	230
	Specific Heat	25℃	J/(kg・K)	720	730	730	-
Electrical Properties	Dielectric Constant	1MHz		9.0	7.9	7.9	-
	Dielectric Tangent	1MHz	10^{-3}	0.2	0.6	0.6	-
	Volume Resistivity	25℃	Ωcm	>10^{14}	1.5×10^{16}	1.5×10^{16}	-
	Dielectric Strength Voltage	DC	kV/mm	>15	20	20	-

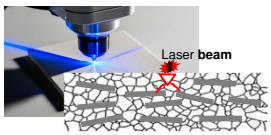
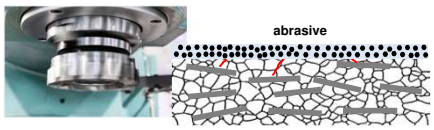
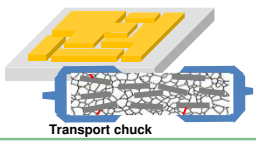
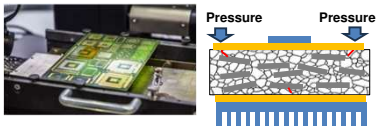
*Measured values in the table are actual values, not product standard values.

◆Mechanical Strength Enhancement Method

	Competitive Product	U-MAP Product
	AlN Substrate	High Strength AlN Substrate
Crack growth	In linear pattern 	deflecting 

The fibrous AlN filler enhances deflection, increasing fracture energy and improving fracture toughness.

◆Suppresses microcrack progression during processing

Processing				Assembly
Laser Processing (Outer Diameter Processing)	Grinding	Polishing	Metallization	Module Assembly
				
Cracks occur during scribe break	Surface cracks develop and spread during polishing		Cracks spread, causing breakage during transport	Reflow heating or warping causes crack propagation

Adopting U-MAP's AlN Substrate

Reduces New Crack Formation	Enables Thinner Sheets Maintains Thermal Resistance	Better Handling and Yield	Prevents Cracking for Easy Assembly