



**PLASMAPURE-UC™** HIGH-PURITY  
ALUMINA

### ULTRA-PURE ALUMINA FOR EXTREME-DUTY SEMICONDUCTOR APPLICATIONS

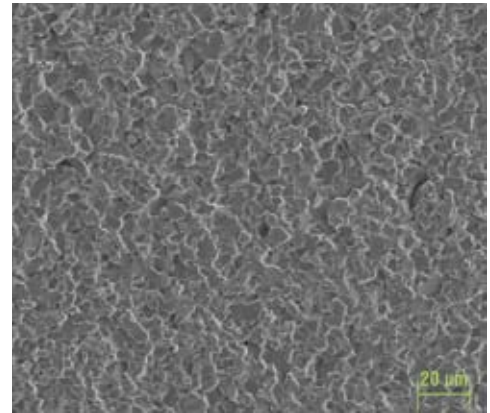
Developed specifically for applications in semiconductor, electronic, and optical industries, CoorsTek® PlasmaPure-UC™ alumina offers exceptionally high purity (99.9% Al<sub>2</sub>O<sub>3</sub>), high etch resistance in corrosive chemistries, low-sodium content, and an extremely low dielectric loss tangent of < 0.00002.

Fabricated using specialized processing techniques, this material provides four times the corrosion resistance, and six times lower sodium content than competitive aluminas.

From 18 state-of-the-art facilities worldwide, CoorsTek offers design-to-print services and finishing processes including precision grinding, lapping, metallizing, machining, laser machining, electroplating, and more.

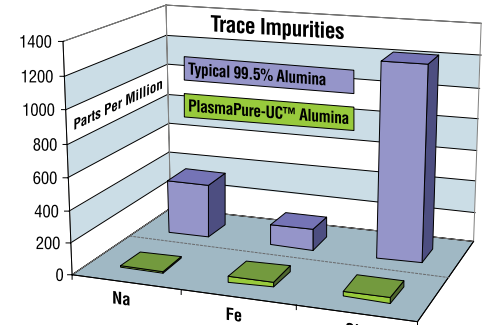
#### Semiconductor Ceramics Experts

CoorsTek leads the semiconductor ceramic components market with innovative, high-performance materials. **Call +1.303.277.4746** to specify PlasmaPure-UC alumina for your next application.

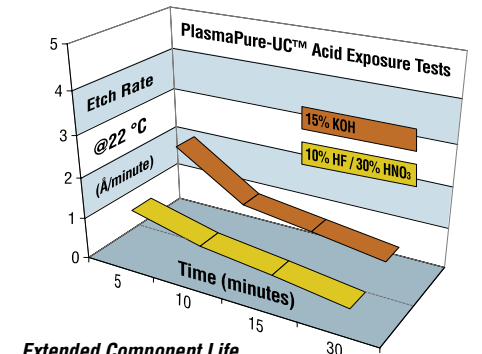


PlasmaPure-UC alumina at 500x SEM image shows highly dense, fine-grained structure.

Material Properties					
Properties		Units	Test	Typical 99.5% Alumina Nominal 99.5% Al <sub>2</sub> O <sub>3</sub>	PlasmaPure-UC Alumina Nominal 99.9% Al <sub>2</sub> O <sub>3</sub>
Density		g/cc	ASTM-C20	3.91	3.92
Grain Size	Average	MICRONS	THIN-SECTION	6	3
Water Absorption		%	ASTM-373	0	0
Gas Permeability		-	-	0	0
Color		-	-	IVORY	IVORY
Flexural Strength (MOR)	20 °C	MPa (psi x 10 <sup>3</sup> )	ASTM-F417	379 (55)	400 (58)
Elastic Modulus	20 °C	GPa (psi x 10 <sup>9</sup> )	ASTM-C848	370 (54)	386(56)
Poisson's Ratio	20 °C	-	ASTM-C848	0.22	0.22
Compressive Strength	20 °C	MPa (psi x 10 <sup>3</sup> )	ASTM-C773	2600 (377)	2700 (392)
Hardness			KNOOP 1000gm	14.1 (1440)	14.5 (1480)
			ROCKWELL 45 N	83	86
Tensile Strength	25 °C	MPa (psi x 10 <sup>3</sup> )	ACMA TEST #4	262 (38)	283 (41)
Fracture toughness	K	Mpa m <sup>1/2</sup>	NOTCHED BEAM	4-5	4-5
Thermal Conductivity	20 °C	W/m °K	ASTM-C408	30.0	35.0
Thermal Expansion (CTE)	25-1000 °C	1 x 10 <sup>-6</sup> / °C	ASTM-C372	8.2	8.1
Specific Heat	100 °C	J/kg*K	ASTM-E1269	880	870
Thermal Shock Resistance	Δ T <sub>c</sub>	°C	NOTE 1	200	200
Dielectric Strength	6.35 mm	ac-kV/mm (ac V/mil)	ASTM-D116	8.7 (220)	8.7 (220)
	1 MHz		ASTM-D150	9.8	9.8
Dielectric Constant (K)	5 GHz		NOTE 2	9.8	9.8
	1 MHz		ASTM-D150	<1 x 10 <sup>-4</sup>	<1 x 10 <sup>-4</sup>
Dielectric Loss (tan delta)	5 GHz		NOTE 2	8.5 x 10 <sup>-5</sup>	2.0 x 10 <sup>-5</sup>
	25 °C	ohm-cm	ASTM-D1829	>10 <sup>14</sup>	>10 <sup>15</sup>
Volume Resistivity	500 °C	ohm-cm	ASTM-D1829	2 x 10 <sup>10</sup>	1 x 10 <sup>12</sup>
	1000 °C	ohm-cm	ASTM-D1829	2 x 10 <sup>6</sup>	1 x 10 <sup>7</sup>



**Reduce Contamination**  
Using PlasmaPure-UC alumina significantly reduces particulate shedding and contamination.



**Extended Component Life**  
Highly resistant to harsh chemistries, PlasmaPure-UC alumina displays exceptionally low etch rates.



Engineering data is representative. Property values vary somewhat with method of manufacture, size, and shape of part. Any suggested applications are not made as a representation or warranty that the material will ultimately be suitable for such applications. The customer is ultimately responsible for all design and material suitability decisions. Data contained herein is not to be construed as absolute and does not constitute a representation or warranty for which CoorsTek assumes legal responsibility. Any warranty or representation for which CoorsTek is responsible shall be subject to a separately negotiated agreement.

Note 1. THERMAL SHOCK RESISTANCE - Tests are run by quenching samples into water from various elevated temperatures. The change in temperature where a sharp decrease in flexural strength is observed is listed as T<sub>c</sub>.

Note 2. MICROWAVE DIELECTRIC PROPERTIES - Dielectric constant and loss are evaluated by a resonance method utilizing the TE011 mode.

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