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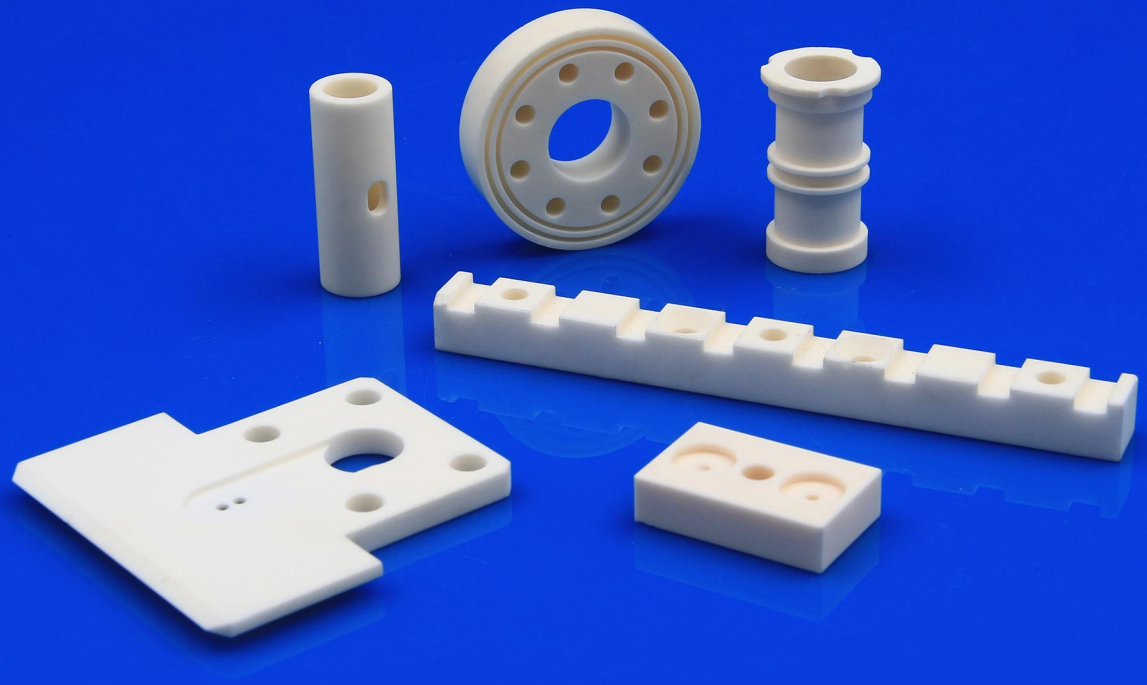
Alumina Ceramic

Introduction



Alumina ceramic (Aluminum Oxide or Al_2O_3) is an excellent electrical insulator and one of the most widely used advanced ceramic materials. In addition, it is extremely resistant to wear and corrosion and is an industrial ceramic that can only be formed by diamond grinding. The melting point is very high at 2,072°C and it is very hard. Alumina components can be widely used in electronics, pump components and automotive sensors.

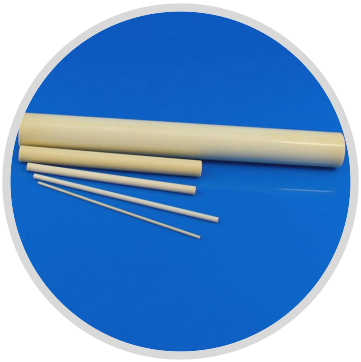
Benefits

1. High reliability and safety
2. High density and mechanical property
3. High Temperature Resistant
4. Excellent corrosion and wear resistance
5. Self-Lubricating and Self-Cleaning

Forming

- Dry Pressing
- Cold Isostatic Pressing
- Injection Moulding Pressing
- Hot Pressing
- CNC Processing

Applications



Pump and Valve Parts

Pump Plunger, Magnetic pump shafts and sleeves for superior wear resistance. In ball and faucet valves, ceramic are used to provide excellent sealing quality and wear resistance.

Medical Equipment and Chemical Analyzer Parts

The chemical stability of ceramics permits their application to the artificial kidney pump. Free from corrosion and superior in cleaning properties, ceramic material are also used in blood valves.

Nozzle

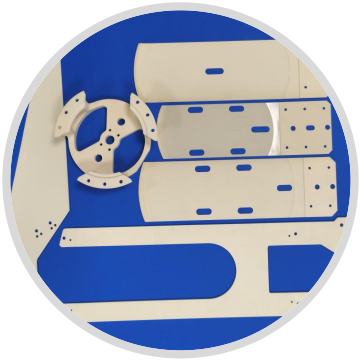
Scrubber and Spay nozzles require ceramic excellent chemical and wear resistance. In cleaning nozzles, through which water flows at a high rate, wear resistance is essential ceramic superior heat resistance is utilized in welder and burner nozzles.

Grinding Mill Parts

Benefiting form high wear resistance, grinding mills use ceramics for their liners, agitator screws and rollers. Balls mill are manufactured from the same materials being milled.

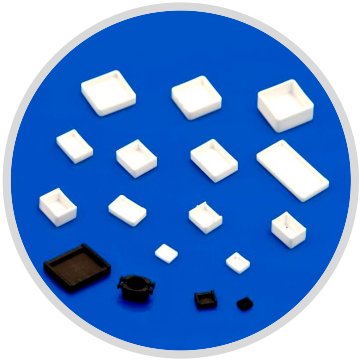
Food Machine Parts

The inherent cleanliness and simple cleaning procedures of ceramics are greatly appreciated in kneading rollers and in parts for filling machines such as valves and pumps.



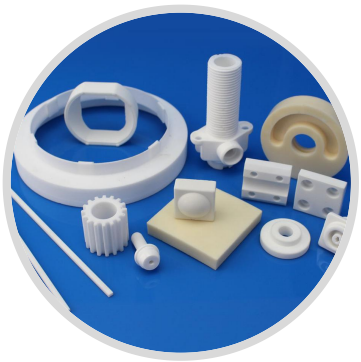
Alumina Parts for Semiconductor

Alumina is a commonly used material in the semiconductor industry due to its excellent properties such as high thermal conductivity, electrical insulation, and resistance to corrosion. Alumina parts play a crucial role in semiconductor manufacturing processes by serving as components in various equipment and tools.



Alumina Parts for Electronics

Alumina caps for packaging applications refer to the use of alumina ceramic closures or lids in packaging designs for various products. Alumina caps offer unique properties that make them suitable for packaging solutions that require high thermal stability, chemical resistance, and reliability.



Customized Alumina Parts

The unique combination of properties exhibited by alumina makes it a valuable material for a wide range of engineering and industrial applications. So most of Alumina parts are customized by customers' requirement.

95% Alumina Ceramic Material Propertie

Properties	Unit	Value
Alumina Content	%	≥95
Color	-	White, Lvory white
Density	g/cm^3	≥3.7
Air Tightness	-	Airtight
Water Absorption	-	≤0.2
Mohs Hardness	GPa	8.80
Bending Strength (20℃)	MPa	290.00
Compressive Strength (20℃)	MPa	1,910.00
Long-term Using Temperature	℃	1,400.00
Thermal Expansion Coefficient (25-800℃)	10^{-6}/K	7.60
Thermal Conductivity (25℃)	W/m·k	20.00
Dielectric Strength (5mm thickness)	AC-KV/mm	10.00
Dielectric Constant (25℃@1MHz)	-	9.20
Dielectric Loss (25℃@1MHz)	-	0.0004

99% Alumina Ceramic Material Propertie

Properties	Unit	Value
Alumina Content	%	≥99
Volume Density	g/cm^3	≥3.80
Hardness (HRA)	HRA	≥88
Flexural Strength	MPa	≥300
Peak Temperature	℃	1,500.00
PressuretightnessTest	-	Pass
Thermal Shock Test	-	Pass
Coefficient of Linear Expansion	x10^{-6}/℃	8.00
Dielectric Constant	εr 20℃, 1MHz	9.50
Dielectric Loss	tanδx10^{-4}, 1MHz	2.00
Volume Resistivity	Ω·cm 20℃	1,014.00
Disruptive Strength	KV/mm, DC	≥20
Acid Resistance	mg/cm^2	≤3.0
Alkali Resistance	mg/cm^2	≤0.1
Abrasive Resistance	g/cm^2	≤0.1
Compressive Strength	MPa	≥2500
Breaking Strength	MPa	≥230
Elasticity Modulus	GPa	300.00
Poisson's Ratio	-	0.20
Thermal Conductivity	W/m·K (20℃)	26.00

99.5% Alumina Ceramic Material Propertie

Properties	Units	Value
Alumina Content	%	99.5
Tmeperature	℃	1600
Color	-	Lvory
Denstity	g/cm^3	3.98
Bending Strength	MPa	425
Young Modulus	GPa	410
Hardness	GPa	15.7
Poisson's Ratio	-	0.24
Fracture Toughness	MPa $m^{1/2}$	4.0
Coefficient of Thermal Expansion (Room temperature - 800℃)	$x10^{-6}$	7.8
Thermal Conductivity	W/(m·K)	34.0
Specific Heat	J/(kg·K)	$0.78x10^3$
Dielectric Coefficient	(1MHz)	9.8
Dielectric Loss	$x10^{-4}$ (1MHz)	5
Volume Resistance	Ω·cm	$>10^{15}$
Dielectric Strength	kV/mm	15
Optical Properties (Wavelength 240 - 2,600nm, Curved Pat Ra 0.8)	%	-

99.8% Alumina Ceramic Material Propertie

Properties	Test Conditions	Units	Value
Alumina Content	-	%	99.8
Color	-	-	Ivory
Bulk Denstity	-	g/cm^3	3.89
Water-absorption	-	%	0
Grain Size	-	μm	4-5
Vickers Hardness, HV1.0	Load 4.9N	GPa	≥15
Flexural Strength, RT	-	MPa	≥300
Coefficient of Linear Expansion	20-500℃	$1x10^{-6}mm/℃$	6.5-7.5
	20-800℃		6.5-8.0
Thermal Conductivity, RT	20℃	W/m·K	≥20.9
Specific Heat Capacity	-	kJ/(kg·K)	≥0.8
Dielectric Strength	-	KV/mm	≥12
Electrical Resistivity, RT	20℃	Ohm.cm	$≥10^{14}$
	300℃		$≥10^{11}$
	500℃		$≥10^{9}$
Permittivity	1MHz	-	9-10
Dielectric Dissipation Factor	1MHz	-	$≤3x10^{-4}$
Surface Roughness	-	μm	0.1-0.4

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