CEC

Advanced Ceramics

Tianjin Century Electronics Co., Ltd

Brief Introduction of the Company

Tianjin Century Electronics Co.,Ltd was registered in Tianjin Port Free Trade Zone as an independent corporation in August, 1997. It is a company specialized in exporting Chinese products, which mainly include power electronics devices. It is also a foreign trade company authorized by Chinese government, which is devoted in importing & exporting products & technology.

The earliest business can be traced to 1987, when the company discussed exporting ceramic housings, ceramic rings and Mo round discs used in controlled silicons with American IR company. For these years, there are many clients good at business in more than twenty countries and regions, and we always keep excellent cooperation relationship with world well known companies, such as IR, ABB, Eupec & Powerex, etc. At present, there are also more than ten agents for our company in Asia, Africa, Europe & America. Recently, our company is developing the export of technology & whole set equipments actively, and takes technology export as our main developing strategy.

Hope to establish wide and long-term business relationship with all friends, leading to the bright future!

First Class Products Service

First Class Technical Service

First Class Quality Credit


TÜV CERT

CERTIFICATE

The TÜV CERT Certification Body of TÜV Anlagentechnik GmbH

Tianjin Century Electronics Co., Ltd.

No. 6, Wanqing Road, Haoi District, Tianjin 300074,P.R. China

DIN EN ISO 9001:2000


Huaxia Credit

Certificate Of Business Credit Rating

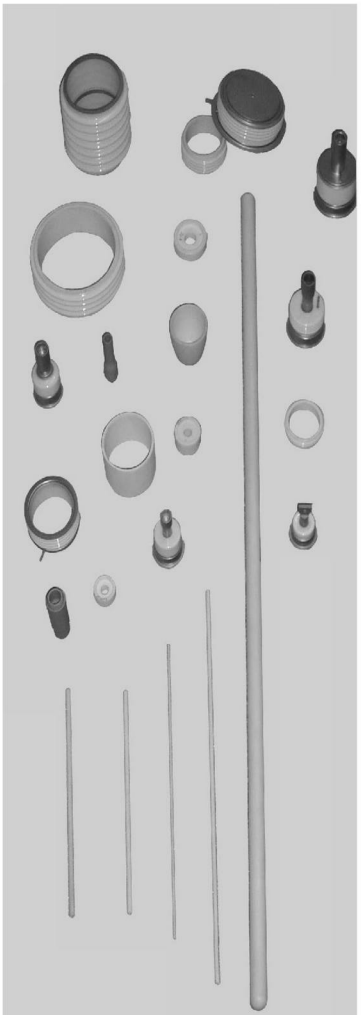
Certificate to Achievement

Awarded to

天津森诚电子有限公司

TIANJIN CENTURY ELECTRONICS CO.,LTD.

President



Catalogue

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5 Semiconductor Refrigerator Assemblies of Alumina(Al_2O_3)

6 Direct Copper Bonded (DCB) Ceramic Substrates

7 Aluminum Nitride(AIN)

8 Zirconia(ZrO_2)

9 Beryllia(BeO)

10 Silicon Nitride (Si_3N_4)

11 Silicon Carbide (SiC)

12 Boron Nitride (BN)

13 Zirconia Toughened Alumina(ZTA)

14 Mullite , Steatite

15 Cordierite

Alumina (Al_2O_3)

Features

- Lower Thermal Expansion Coefficient
- Lower Dielectric Constant and Loss
- Higher Flexural Strength

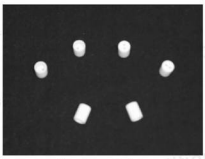
Applications

- Ceramic-metal Housings for Rectifier and Thyristor
- Ceramic Substrates for Power SemiconductorDevice
- Thick Film and Thin Film
- Direct Copper Bonded
- Bolts, Nuts, Washers
- Rods, Tubes
- Plates, Discs
- Standoff Insulators

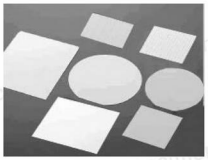
Characteristics of Material

Item	Unit	Value		
Alumina Content	%	93	96	99
Bulk density	g/cm^3	3.6	3.7	3.8
Water Absorption	%	0	0	0
Flexural Strength	MPa	>310	>310	>340
Yong's Modules	GPa	290	330	370
Dielectric Constant (at 1MHz)		8.8	9.4	9.9
Dielectric Loss Angle (at 1MHz)	$\times 10^{-4}$	6	4	2
Dielectric Strength	kV/mm	>15	>15	>15
Thermal Expansion Coefficient	$\times 10^{-6}$/℃	7.1	7.2	7.3
Thermal Conductivity (at 20℃)	W/m.K	22	27	33
Volume Resistivity (at 20℃)	Ω cm	$>10^{14}$	$>10^{14}$	$>10^{14}$

Bed knife

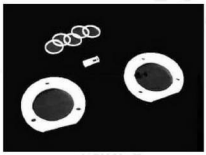


Small insulators



Substrates

Cast component

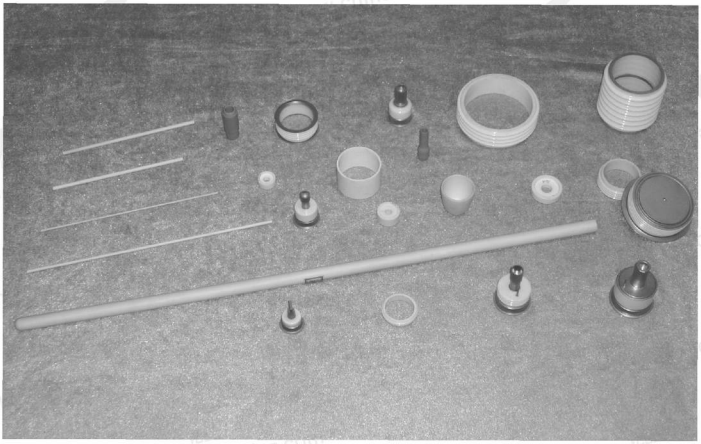


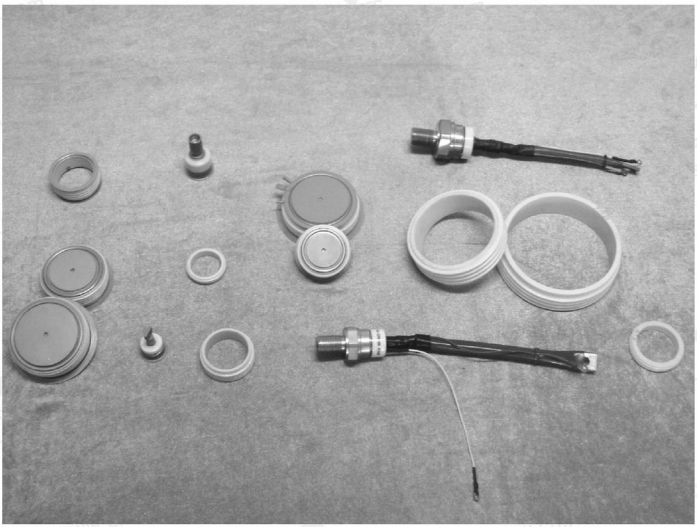
Spacers

Insulators

Nozzles

Insulating plates





Ceramic parts for power semiconductor devices

Structure Parts of Alumina (Al_2O_3)

Features

- Higher Mechanical Strength
- Higher Dielectric Strength

Applications

- Support Insulators for Electronic Instrument, Meter and Automobile
- Tubes
- Plates
- Various Parts

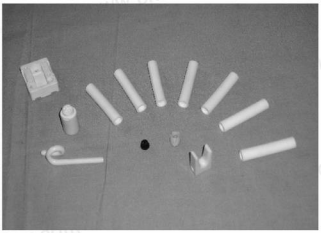
Characteristics of Material

Item		Unit	Value		
Alumina Content		%	MS-1 Steatite	A-75 75	A-95 95
Bulk Density		g/cm³	2.7	3.2	3.6
Bending Strength		MPa	>140	>200	>280
Dielectric Constant	at 1MHz 20℃		7.5	9	9~10
	at 1MHz 500℃		——	——	9~10
	at 10GHz 20℃		——	——	9~10
Dielectric Loss Angle	at 1MHz 20℃		8	10	4
	at 1MHz 500℃	$\times 10^{-4}$	——	——	30~40
	at 10GHz 20℃		——	——	10
Thermal Expansion Coefficient	at 20℃~100℃		8	6	——
	at 20℃~500℃	$\times 10^{-6}$/℃	——	——	6.5~7.5
	at 20℃~800℃		——	——	6.5~8
Volume Resistivity	at 100℃		$>10^{12}$	$>10^{12}$	$>10^{13}$
	at 300℃	Ω cm	——	——	$>10^{10}$
	at 500℃		——	——	$>10^{8}$
Dielectric Strength (at D.C)		kV/mm	>20	>20	>18

Pipe fittings

Crucibles

Support insulators



Various insulating parts

Protection Pipe and Insulating Pipe of Alumina (Al_2O_3)

Features
- High Mechanical Strength
- High Thermal Conductivity
- High Spalling Resistance
- High Softening Temperature
- Excellent Insulativity
- Etching Resistance

Application
- Temperature Measuring Meters
- Protection and Insulation for Thermocouples, Thermometers
- Furnace Tube for Resistance Furnaces, Heat Treatment Furnaces
- Chemical Analysis for Steel, Iron
- Various Insulating Parts for High Temperature Resistance and Etching Resistance

Structure Model
- Round, Oval
- Mono-hole, Double-hole, Multi-hole
- Threaded
- Rhombohedral

Characteristics of Material

Item		Unit	Value	
			High Alumina	Corundum
Al_2O_3 Content		%	85	99～99.5
SiO_2 Content		%	12	0.2
Fe_2O_3 Content		%	0.2	0.05～0.1
Mohs Hardness			7	8～9
Bulk Density	Injection molding	g/cm³	3.5～3.6	3.7～3.9
	Extrusion molding		3.4～3.5	3.7～3.8
	Hot-press molding		3.4～3.5	3.7～3.85
Water Absorption		%	<0.2	0.1～0.2
Bending Strength	Injection molding	MPa	180	200
	Hot-press molding		140	150
Operating Temperature		℃	Long term 1450 Short term 1600	Long term1600
Max. Operating Temperature		℃	1600	1800

Dimensions of Insulating Pipes of High Alumina and Corundum Ceramic

Unit: mm

Hole Nos	Value		
	O.D	I.D	Length
Mono-hole	1～15	0.5～10	5～1000
Double-hole	2～15	0.5～4	5～2000
Flat double-hole	3×5～7×12	0.5～5	5～200
Four-hole	4～15	0.5～4	5～2000

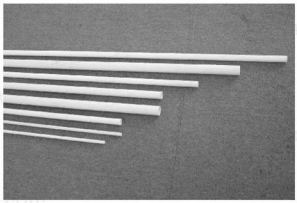
Dimensions of Ceramic Protection Pipes for Thermocouples

Unit: mm

Item	Value						
O.D	6	8	10	12	16	20	25
I.D	4	6	7	8	12	15	19
Length	100～2165						

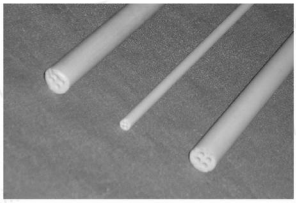
Products of other specifications can be produced according to customers' requirements.

Insulating pipes of high alumina



Insulating pipes of corundum

Insulating pipes of corundum



Multi-holes protection pipes

Semiconductor Refrigerator Assemblies of Alumina (Al_2O_3)

Features

- Small Volume
- Light Weight
- Long Life
- High Reliability
- Heating and Refrigeration

Application

- Electron Communication
- Laboratory Devices
- Medical Instruments
- Fridges for Automobiles
- Drinkers

Specifications of Alumina (Al_2O_3) Substrate

Item	Unit	Value
Alumina Content	%	96
Dielectric Constant (at 25℃,1MHz)		9～10
Dielectric Loss Angle(at 25℃,1MHz)	$\times 10^{-4}$	<4
Insulating Strength	kV/mm	>15
Volume Resistivity (at 25℃)	Ω cm	$>10^{13}$
Thermal Expansion Coefficient (at 25～50℃)	10^{-6} /℃	6.5～7.5
Bending Strength	MPa	>2800

Dimensions & Metallized Type of Alumina (Al_2O_3) Substrate

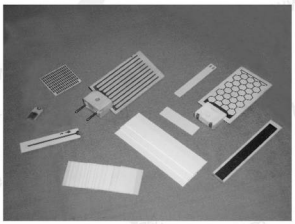
Unit: mm

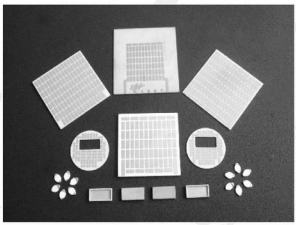
Type	L×b	h	Metallized Type
ZL-01	50×50	0.80	Mo-Mn, Ni plated Mo-W, Ni plated Ag , Sn dipped DCB, Sn dipped
ZL-02	50×50	1.00	
ZL-03	40×40	0.68	
ZL-04	40×40	0.80	
ZL-05	40×40	1.00	
ZL-06	39.5×39.5	1.00	
ZL-07	39.5×39.5	0.80	
ZL-08	39.5×39.5	0.68	
ZL-09	30×30	0.68	
ZL-10	30×30	0.80	
ZL-11	29.5×29.5	0.68	
ZL-12	29.5×29.5	0.80	

Dimension , electrode figure and metallized type can be produced according to customers' requirements.

Specifications of Semiconductor Refrigerator Assemblies (Disc Type)

Type	Main Parameters				Dimensions			Weight
	Imax A	△Tmax ℃	V V	Qmax W	l mm	b mm	h mm	g
TEC1-01703	3.3	60	1.9	3.9	15	15	4.7	4.3
TEC1-12703	3.3	60	14.5	29.3	40	40	4.7	25.3
TEC1-01709	9.0	65	2.06	10.3	22	22	5.6	10.1
TEC1-04914	14	62	5.93	46.2	36	36	4.6	21
TES1-12703	3.0	62	15.4	25.7	30	30	3.6	12





Semiconductor refrigerator assemblies

Direct Copper Bonded (DCB) Ceramic Substrates

Features

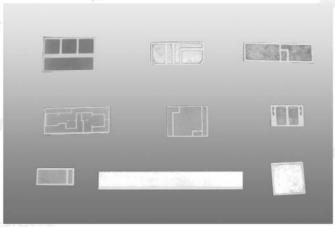
- Fine Mechanical strength
- Fine Adhesion and Corrosion Resistent
- Excellent Electrical Insulation and Thermal Conductive Properties
- High Reliability
- Lower Thermal Expansion Coefficient
- Etchable to Various Graphs

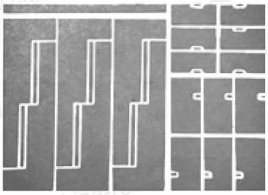
Applications

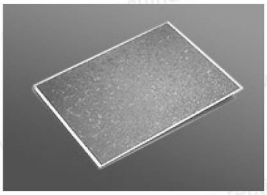
- Power Semiconductor Modules
- Power Hybrids
- Power Control Circuits
- Solid-state Relays
- Semiconductor Refrigerators
- Electronic Devices for Automobile
- Intelligent Power Assemblies
- Solar Cell Board

Characteristics of Material

Item		Unit	Value	
Ceramic	Content	%	$96Al_2O_3$	96AlN
	Thickness	mm	0.25, 0.38, 0.5, 0.63(std.), 0.76, 1.0	
	Dielectric Constant (at 25℃,1MHz)		9.4	8.9
	Dielectric Loss Angle (at 25℃,1MHz)	$\times 10^{-4}$	3	3
	Dielectric Strength	kV/mm	>14	>14
	Thermal Conductivity (at 25℃)	W/m.K	24～28	150
Copper layer	Thickness	mm	0.3	
	Thermal Conductivity	W/m.K	385	
DCB	Dimension (max.)	mm×mm	127×198	75×57
	Thermal Expansion Coefficient	10^{-6}/℃	7.4(25～200℃)	5(50～500℃)
	Bounding Force	N/mm	>6	>3
	Bending	μ m/mm	<150/50	
	Operating Temperature (inert atmosphere)	℃	-55～+850	
	Plating		Au or Ni plated or bare Cu	
Note: Dimension and etching graph of DCB substrate can be produced according to customers' requirements.				







Various DCB ceramic substrates

Aluminum Nitride (AIN)

Features

- High Thermal Conductivity
- Thermal Expansion Coefficient Close to That of Si
- High Resistivity
- Low Dielectric Constant and Loss
- Inert to Almost All Molten Metals
- Excellent Mechanical Strength

Applications

- Circuit Substrates for Semiconductor Module and IC
- Heat Sink Materials for Power Transitors , Thyristors, LDs and LEDs etc.
- Crucibles for Molten Metal and Preparing Single Crystals
- Window Material for Infrared ray and Radar

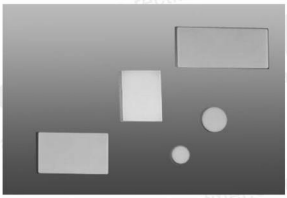
Characteristics of Material

Item	Unit	Value
Bulk Density	g/cm³	3.24～3.3
Thermal Expansion Coefficient	10^{-6}/℃	4.36 (at 20～400℃)
Modulus of Elasticity	GPa	310
Mohs Hardness		7～8
Fracture Toughness	MPam$^{1/2}$	3.2～3.35
Vickers Hardness	GPa	12
Bending Strength	MPa	＞325
Thermal Conductivity	W/m.K	170～228
Dielectric Constant (at 1MHz)		8.6
Dielectric Loss Angle(at 1MHz)	$\times 10^{-4}$	5～10
Dielectric Strength	kV/mm	＞15
Volume Resistivity	Ω cm	$>3.6\times10^{13}$

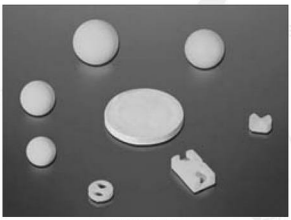
Metallized AlN Substraters

Item	Metallized Method						
Material	Pd-Ag	W-Mo	Mo-Mn	Pt-Ag	Ti/Cu/Ni/Au	Ta_2N/Ni	DCB
Feature	Thick film	Thick film	Thick film	Thick film	Thin film	Thin film	Direct Copper Bonded

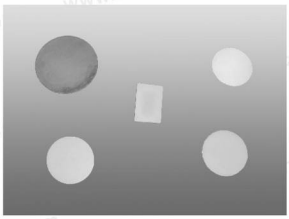
Crucible



Window materials for infrared and radar applications



Balls and parts



Plates, discs

Zirconia (ZrO_2)

Features

- High Density and Toughness
- Super Hardness
- Strong Wear and Corrosion Resistant
- Prevention of Contamination
- High Temperature Proof
- Acid and Alkaline Resistance

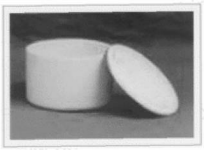
Applications

- Ball Valve ,Ball Bearing
- Bed Knife ,Razor Back Knife
- Crucible
- Ferrule and Sleeve for Optic Fiber Communication
- Ring ,Plate ,Pipe ,Box
- Friction Disc for Textile Machines
- Oil Valve

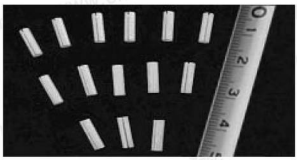
Characteristics of Material

Item	Unit	Value
Bulk Density	g/cm³	6.0
Hardness	HRA	87
Thermal Expansion Coefficient	10^{-6}/℃	9.6 (at 20～400℃)
Modulus of Elasticity	GPa	200～500
Fracture Toughness	MPam$^{1/2}$	10
Bending Strength	MPa	＞1150
Thermal Conductivity	W/m.K	2.5

Bearing

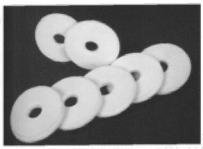


Crucibe



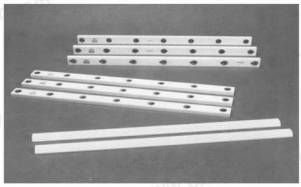
Ferrule and sleeve for optic fiber

Fruit knife

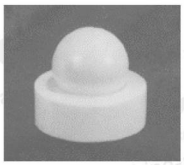


Friction disc

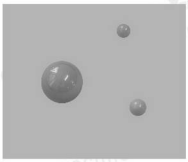
Sleeve



Bed knife



Oil value



Ball

Beryllia (BeO)

Features

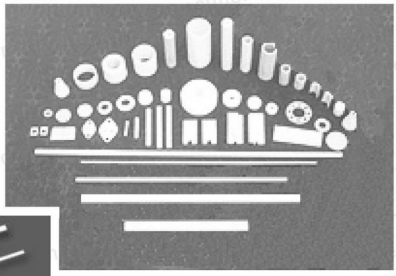
- High Thermal Conductivity
- Low Dielectric Constant
- Low Dielectric Loss

Applications

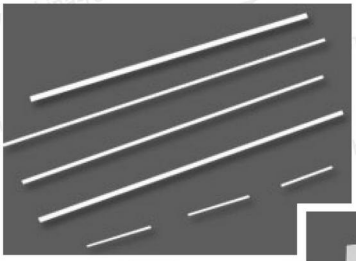
- Heat Emission for Power Semiconductor Devices and IC
- Tubes and Rods
- Bars, Plate and Blocks

Characteristics of Material

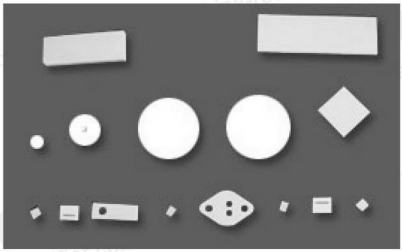
Item	Unit	Value
Bulk Density	g/cm³	2.9
Mohs Hardness		8
Thermal Expansion Coefficient	10^{-6}/℃	7～8.5
Modulus of Elasticity	GPa	345
Flexural Strength	MPa	205
Tensile Strength	MPa	125
Compressive Strength	MPa	1550
Dielectric Constant (at 1MHz)		6.7
Dielectric Loss Angle (at 1 MHz)	$\times 10^{-4}$	5
Dielectric Strength	kV/mm	10～14
Thermal Conductivity (at 25℃)	W/mK	250
Volume Resistivity（at 25℃）	Ω cm	$>10^{14}$



Bars,plates,blocks



Pipes, rods



Plats, discs

Silicon Nitride (Si_3N_4)

Features

- More Light
- Super Hardness
- Low Thermal Expansion Coefficient
- High Mechanical Strength and Fracture Toughness
- Resistant to Deformation at Elevated Temperature

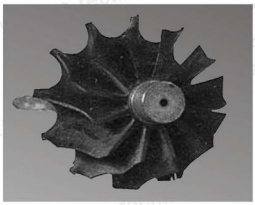
Applications

- Valves, Pistons for Gas Turbines
- Parts for Diesel Engines
- Cutting Tools for Processing Gray Cast Iron, Ductile cast Iron, Half Steel and Half Iron, High Manganese Steel, Nickel Base Alloy, Titanium Base Alloy, Silicon-chromium Base Alloy, Carbon Steel and Other Non-ferrous Metals
- Bearings

Characteristics of Material

Item	Unit	Value
Bulk Density	g/cm³	3.2
Hardness	HRA	93～94
Thermal Expansion Coefficient	10^{-6}/℃	2.8～3 (at 0～1400℃)
Fracture Toughness	MPam$^{1/2}$	6～8
Bending Strength	MPa	900
Thermal Conductivity	W/m.K	10～45
Dielectric Strength	kV/mm	>10
Volume Resistivity	Ω cm	>10^{14}

Parts for diesel engines



Engine parts for gas turbimes

Balls and bearings

Ferrules

Balls

Pipe, cutting knife

Silicon Carbide (SiC)

Features

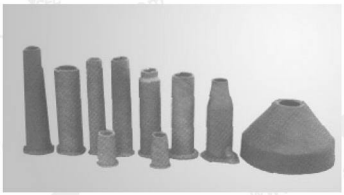
- High Hardness
- High Wear Resistance
- Good Self-greasing Effect
- High Thermal Conductance
- Low Thermal Expansion Coefficient
- High Mechanical Strength at High Temperature
- Strong Wear and Corrosion Resistance

Applications

- Mechanical Seal
- Structure Element

Characteristics of Material

Item	Unit	Value
Bulk Density	g/cm^3	3.2
Mohs Hardness		9
Thermal Expansion Coefficient	$10^{-6}/℃$	4.5 (at 20～400℃)
Fracture Roughness	$MPam^{1/2}$	4～5
Bending Strength	MPa	>440
Thermal Conductivity	W/m.K	>270

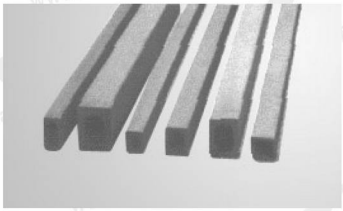


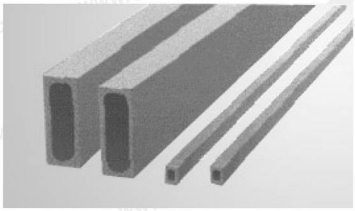
Covers of spray gun for the kiln

Ferrules

Pipe for the kiln

Mechanical seal





Square pipe for the kiln

Boron Nitride (BN)

Features

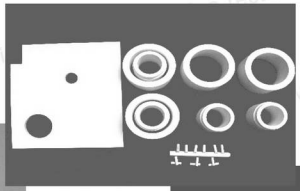
- High Thermal Conductance
- Low Thermal Expansion Coefficient
- Strong Wear and Corrosion Resistance
- High Temperature Proof
- Excellent Electrical Properties
- Low Friction Coefficient
- Ease Machining

Applications

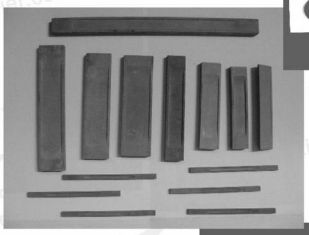
- Insulators for High-temperature Furnace
- High Temperature Nozzles
- Plates
- Evaporation Boat for Coating
- Crucibles

Characteristics of Material

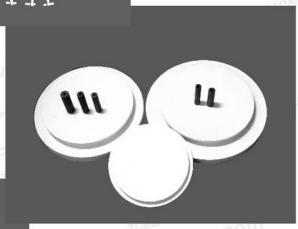
Item	Unit	Value
Bulk Density	g/cm^3	1.9～2.0
Mohs Hardness		1
Thermal Expansion Coefficient	10^{-6}/℃	2.95～3 (at 0～1400℃)
Bending Strength	MPa	44
Dielectric Constant (at 1MHz)		4
Dielectric Loss Angle (at 1 MHz)	$\times 10^{-4}$	2～6
Thermal Conductivity	W/m.K	20～60
Breakdown Voltage	kV/mm	20～30
Volume Resistivity	Ω cm	$>10^{14}$



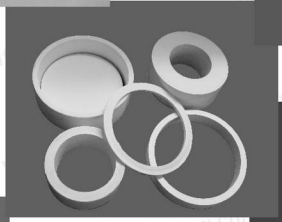
Insulators for high-temperature furnace



Evaporation boats

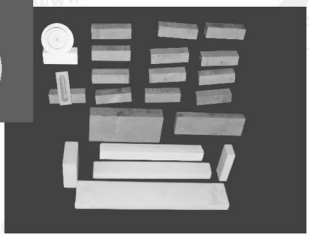


Discs



Ferrules

Crucibles



High temperature nozzles for rate earth and magnet

Zirconia Toughened Alumina (ZTA)

Features

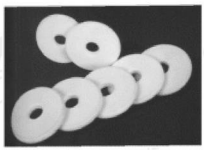
- Price Lower than Zirconia
- Performance Higher than Alumina

Applications

- Crucibles
- Cylinder Liner for Slurry Pump
- Ring, Plate, Pipe, Box
- Various Parts
- Friction Disc for Textile Machine

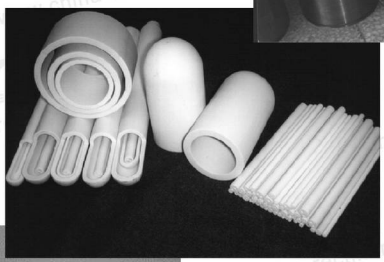
Characteristics of Material

Item	Unit	Value
Mohs Hardness		9
Bending Strength	MPa	455
Fracture Toughness	$MPam^{1/2}$	5.29
Max. Operating Temperature	℃	1010



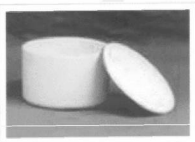
Friction disc

Cylinder liner for slurry pump



Cylinder liner for slurry pump

Various parts



Crucibles

Fextile parts

Mullite

Features

- High Mechanical Strength
- Low Thermal Expansion Coefficient
- Good Anti Thermal Shock Property

Applications

- Protecting Pipe for Thermocouple
- Insulating Pipe
- Insulator
- Lining

Characteristics of Material

Item	Unit	Value
Main Composition		$3Al_2O_3 \cdot 2SiO_2$
Bulk Density	g/cm³	3.1
Mohs Hardness		6～7
Compressive Strength	MPa	1000
Tensile Strength	MPa	100
Bending Strength	MPa	180
Thermal Expansion Coefficient	$\times 10^{-6}$/℃	4.0(at 25～300℃)
Thermal Conductivity	W/m.K	3.9～6.1
Dielectric Constant (at 1MHz)		6.5
Volume Resistivity	Ω cm	$>10^{13}$

Steatite

Features

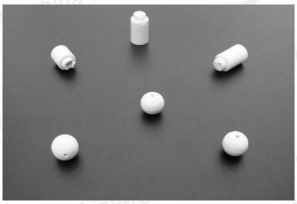
- High Mechanical Strength
- Low Dielectric Loss
- Resistance to Acid and Alkali

Applications

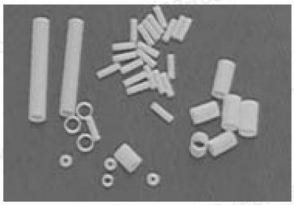
- High Frequency Insulator
- Insulating Parts for Radar and TV

Characteristics of Material

Item	Unit	Value
Main Composition		$MgO \cdot SiO_2$
Bulk Density	g/cm³	2.8～3.1
Mohs Hardness		7.5
Compressive Strength	MPa	580
Tensile Strength	MPa	70
Bending Strength	MPa	125
Thermal Expansion Coefficient	$\times 10^{-6}$/℃	6.9(at 25～300℃)
Dielectric Constant (at 1MHz)		6.0
Dielectric Loss Angle (at 1 MHz)	$\times 10^{-4}$	6～8
Insulating Strength	kV/mm	20～30
Volume Resistivity	Ω cm	$>10^{12}$



Special insulator



Ring, pipe

Cordierite

Features

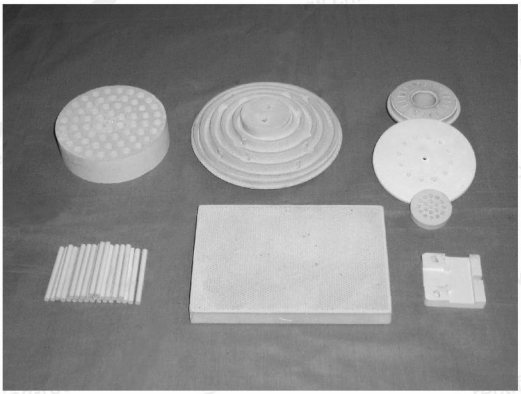
- Low Thermal Expansion Coefficient
- Low Dielectric Constant

Applications

- Automobile Purifier
- Deodorization, Deoxidation and Smoke Extraction
- Infrared Radiator

Characteristics of Material

Item	Unit	Value
Main Composition		$2MgO \cdot 2Al_2O_3 \cdot 5SiO_2$
Bulk Density	g/cm^3	2.2
Mohs Hardness		6.0
Compressive Strength	MPa	275
Tensile Strength	MPa	25
Bending Strength	MPa	65
Thermal Expansion Coefficient	$\times 10^{-6}/℃$	2.2 (at 25~300℃)
Dielectric Constant (at 1MHz)		5.3



Parts of cordierite

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