

We make the world *measurably* better.

For over 100 years, CoorsTek has been perfecting the process of engineering advanced ceramics.

We are prepared to apply expertise to the toughest engineering challenges around the world.

Much like the materials we work with, CoorsTek is versatile and endlessly extendible. we work with our customers to develop tomorrow's technology for just about every industry in the global economy.

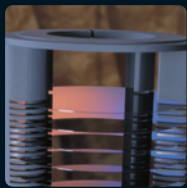
We don't simply deliver high-quality products.

We partner to deliver solutions that make the world measurably better.

The CoorsTek logo is centered at the bottom of the page. It consists of the word "COORSTEK" in a white, serif, all-caps font, set against a solid red rectangular background.

COORSTEK

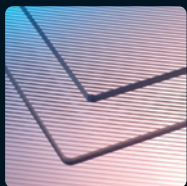
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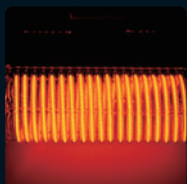
- Carbon Susceptors
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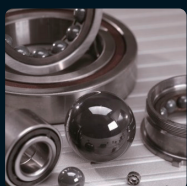
- Large Scale Photomask Substrates



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- Fused Silica Refractories
- SiC Heat-resistant Structural Parts
- SiC Setters & Sagger
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- Carbon Brushes
- Ceramic Balls "CERBEC"



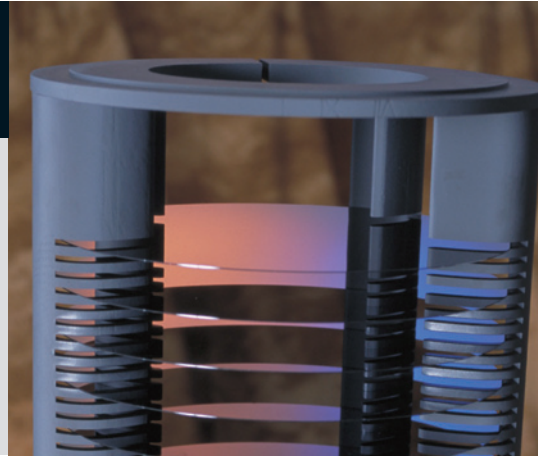
Bio and Medical Related Products

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- Ceramic Bone Substitutes

Semiconductor Related Products

CoorsTek GK develops and manufactures a variety of products made of inorganic materials such as quartz glass, graphite, silicon carbide, single crystal silicon and fine ceramics, all of which are indispensable to the production of semiconductor devices. CoorsTek GK maintains a large market share for many products related to semiconductor manufacturing, a position we achieved by providing high-quality products that contribute to the higher integration and improved productivity of semiconductor devices and by utilizing our unique high-purity material and high-precision machining technologies.



Carbon Susceptors

SEMICONDUCTOR MANUFACTURING PROCESS

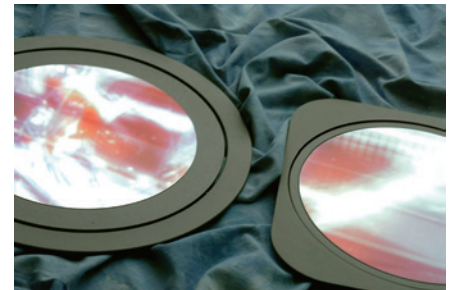


APPLICATION : Wafer carriers for epitaxial growth processing

M A T E R I A L : High-purity SiC coated graphite “CLEAR CARBON”

FUNCTIONS / FEATURES

- High purity
- Controllability of temperature distribution on wafer
- Excellent high temperature durability



SiC Wafer Boats

SEMICONDUCTOR MANUFACTURING PROCESS

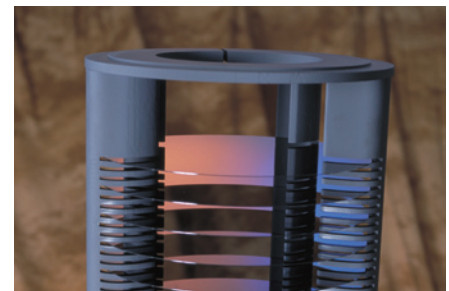


APPLICATION : Wafer carriers for diffusion and LP-CVD processing

M A T E R I A L : High-purity silicon impregnated silicon carbide “TPSS”

FUNCTIONS / FEATURES

- High purity
- High temperature stability (up to 1350°C)
- Less particle generation
- Certified by major furnace manufacturers



Photomask Substrates

SEMICONDUCTOR MANUFACTURING PROCESS

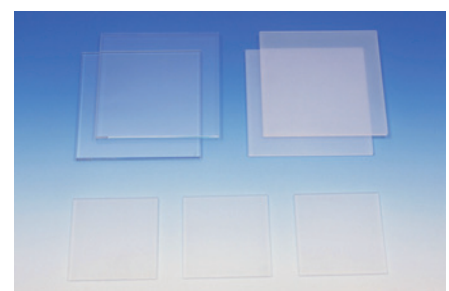


APPLICATION : Photomasks for lithography processing

M A T E R I A L : High-purity synthetic silica glass

FUNCTIONS / FEATURES

- World's most popular substrates for lithography processing, including ArF
- Superior UV transmittance
- Superior ArF laser durability
- Low birefringence



Alumina Plasma Etcher Parts

SEMICONDUCTOR MANUFACTURING PROCESS



APPLICATION : Elements for plasma etching processing

MATERIAL : High-purity translucent alumina “SAPPHAL”

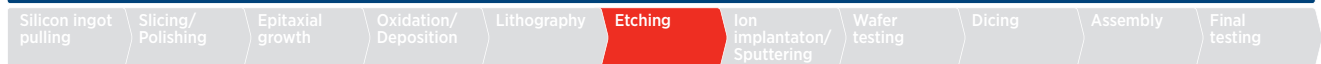
FUNCTIONS / FEATURES

- Extremely high purity ($\geq 99.9\%$)
- Larger grain size and translucency
- Excellent electrical properties (LLT)



Yttria Plasma Etcher Parts

SEMICONDUCTOR MANUFACTURING PROCESS

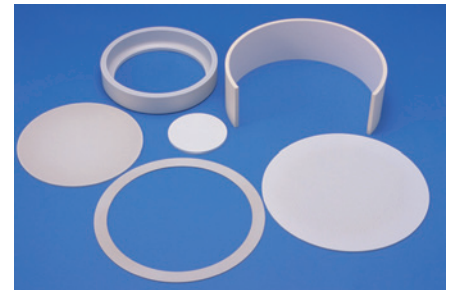


APPLICATION : Elements for plasma etching processing

MATERIAL : High-purity yttria “EXYRIA”

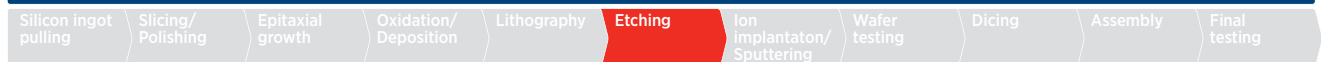
FUNCTIONS / FEATURES

- Excellent plasma durability
- High purity
- Large size production (up to $\phi 550\text{mm}$)



Silicon Focus Rings

SEMICONDUCTOR MANUFACTURING PROCESS

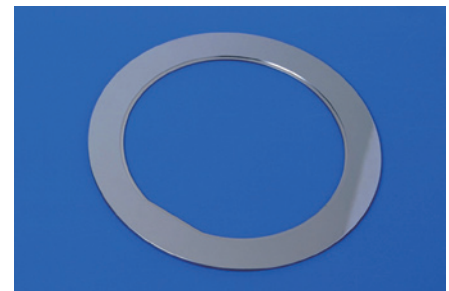


APPLICATION : Focus rings for plasma etching processing

MATERIAL : High-purity single crystal silicon

FUNCTIONS / FEATURES

- High purity
- Surface damage removed by acid etching
- Very low risk of particle generation in use
- Large size production (up to $\phi 510\text{mm}$)



Silicon Susceptors

SEMICONDUCTOR MANUFACTURING PROCESS

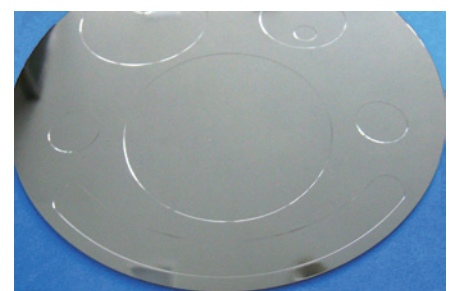


APPLICATION : Wafer carriers/adjusters for various processing

MATERIAL : High-purity single crystal silicon

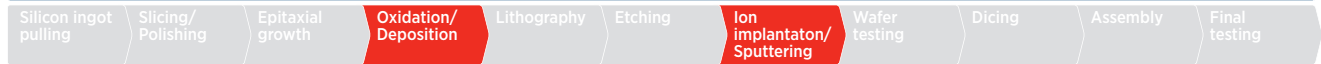
FUNCTIONS / FEATURES

- High purity
- Surface damage removed by acid etching
- Very low risk of particle generation in use
- Large size production (up to $\phi 510\text{mm}$)



SiC Polishing Plates

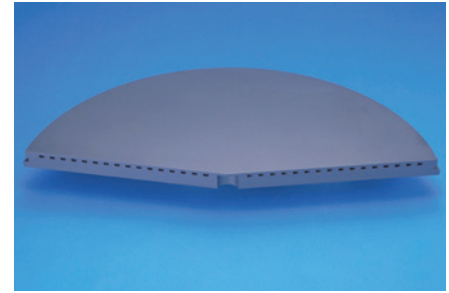
SEMICONDUCTOR MANUFACTURING PROCESS



APPLICATION : Surface plates for wafer polishing
M A T E R I A L : Sintered silicon carbide “CERASIC”

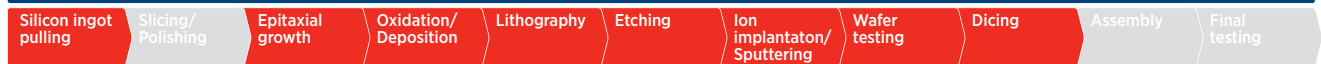
FUNCTIONS / FEATURES

- Exclusive bonding technology
- Large size production
- Precise green body machining



In-line Gas Filters “CEPURE”

SEMICONDUCTOR MANUFACTURING PROCESS



APPLICATION : In-line gas filters for various processing
M A T E R I A L : Porous alumina (filter element), stainless steel, nickel & PTFE

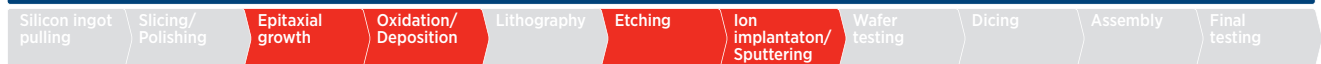
FUNCTIONS / FEATURES

- Superior gas displacement characteristics
- High corrosion resistance



Vacuum-Break Filters

SEMICONDUCTOR MANUFACTURING PROCESS



APPLICATION : Diffusers for vacuum chamber (loadlock, process, etc.)
M A T E R I A L : Porous alumina / Porous silica

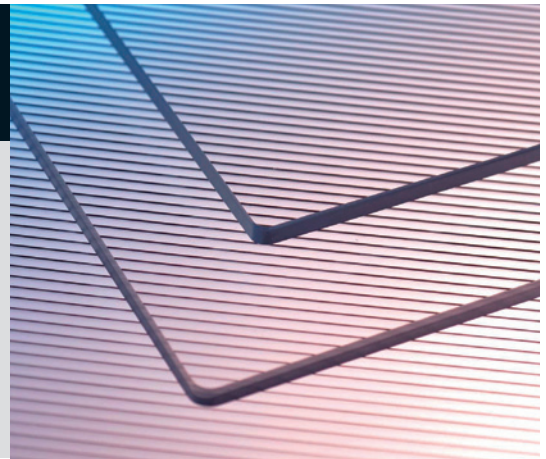
FUNCTIONS / FEATURES

- Prevention of dust dispersion
- Reduction of venting time
- High corrosion resistance



FPD Related Products

Due to the enlargement of flat panel displays (FPD) and the glass substrates that are one of their main components, technologies required for FPD production have been advancing. As higher technical levels have become necessary for manufacturing FPD glass substrates, CoorsTek GK's products for FPD glass substrate manufacturing are able to meet these requirements with our unique high-purity material and high-precision machining technologies for large scale products.



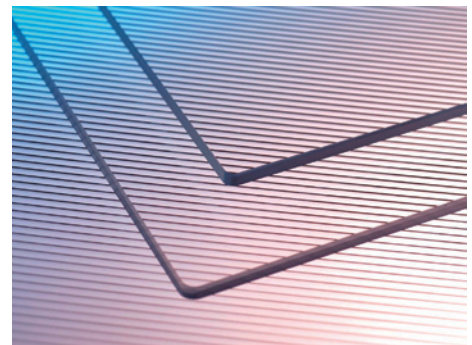
Large Scale Photomask Substrates

APPLICATION : Photomasks for LCD manufacturing

MATERIAL : High-purity synthetic silica glass

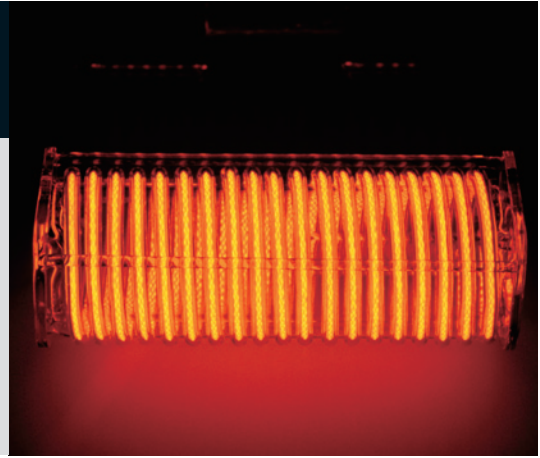
FUNCTIONS / FEATURES

- Low thermal expansion
- Superior transmittance in broad wavelength spectrum
- High purity and high homogeneous
- Large size production (up to 1220x1400mm)



General Industrial Products

CoorsTek GK develops and manufactures a wide range of products made of inorganic materials for use in many industries with extreme environments that require high heat resistance, corrosion resistance, abrasion resistance and/or cleanliness by using in-depth knowledge and an abundance of know-how with materials such as silicon carbide and quartz glass.



Fused Silica Refractories

APPLICATION : Elements of glass melting furnace

MATERIAL : Fused silica refractory "GLASSUN"

FUNCTIONS / FEATURES

- Extremely low thermal expansion
- Low thermal conductivity
- Complicated and very large size production (up to 2000x3000x200mm)



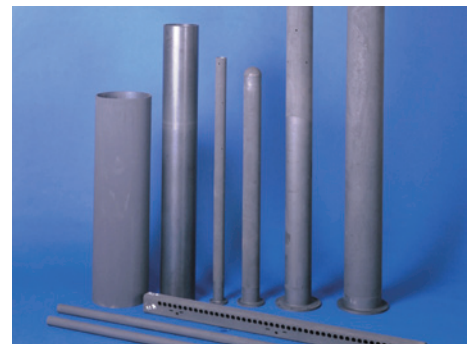
SiC Heat-resistant Structural Parts

APPLICATION : Radiant tubes, heat exchange tubes, etc.

MATERIAL : Sintered silicon carbide "CERASIC"

FUNCTIONS / FEATURES

- Long size production (up to 2350mm)
- High heat resistance and thermal conductivity
- Excellent chemical and corrosion resistance
- Long life



SiC Setters & Saggers

APPLICATION : Kiln furniture for electric parts

MATERIAL : Recrystallized silicon carbide

FUNCTIONS / FEATURES

- Excellent creep resistance and thermal shock resistance
- Excellent temperature followability caused by low heat capacity and high thermal conductivity
- Also available with plasma spray coating



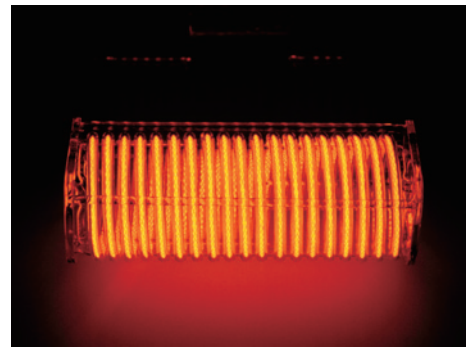
Quartz Carbon Heaters “QCH-HEATER”

APPLICATION : Various rapid, clean and partial heating

MATERIAL : Quartz glass & carbon wire

FUNCTIONS / FEATURES

- High-speed heating (reduction of heating time)
- Long-life (reduction of running costs)
- Clean and non-contact source of energy



Foundry Filters “FLOW-RITE”

APPLICATION : Foundry filters for iron, aluminum and steel

MATERIAL : A kind of mullite

FUNCTIONS / FEATURES

- Excellent hot strength
- Stable filtration performance
- Applicable to various sizes of casting, from small to large

< Manufactured by CoorsTek, Inc. (USA) >



Automotive, Electric & Mechanical Products

CoorsTek GK develops and manufactures automotive, electric and mechanical products whose users require materials with special functions not realized by metal or resin parts.



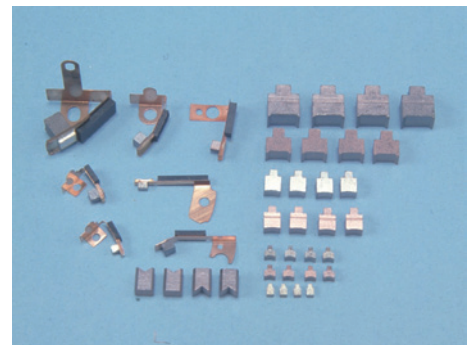
Carbon Brushes

APPLICATION : Brushes for DC electric motors

MATERIAL : Carbon & copper

FUNCTIONS / FEATURES

- Lead-free and silica-free
- Stable quality by high productivity manufacturing process



Ceramic Balls “CERBEC”

APPLICATION : High-temperature and high-speed bearings

MATERIAL : Silicon nitride

FUNCTIONS / FEATURES

- Harder and stiffer
 - High corrosion and electrical resistance
 - Light weight and low thermal expansion
 - Smooth surface and accurate geometry
- < Manufactured by CoorsTek, Inc. (USA) >



Bio and Medical Related Products

As bio and medical needs increase with a rapidly aging society, CoorsTek GK has been developing and manufacturing bio and medical related products with our advanced material and porous medium forming technology.



Ceramic Bone Substitutes

APPLICATION : Artificial bones for orthopedic surgery

MATERIAL : 3D-interconnected porous structure hydroxyapatite

FUNCTIONS / FEATURES

- New natural bone growing inside
- High biocompatibility
- Good machinability



Main Material Line-up

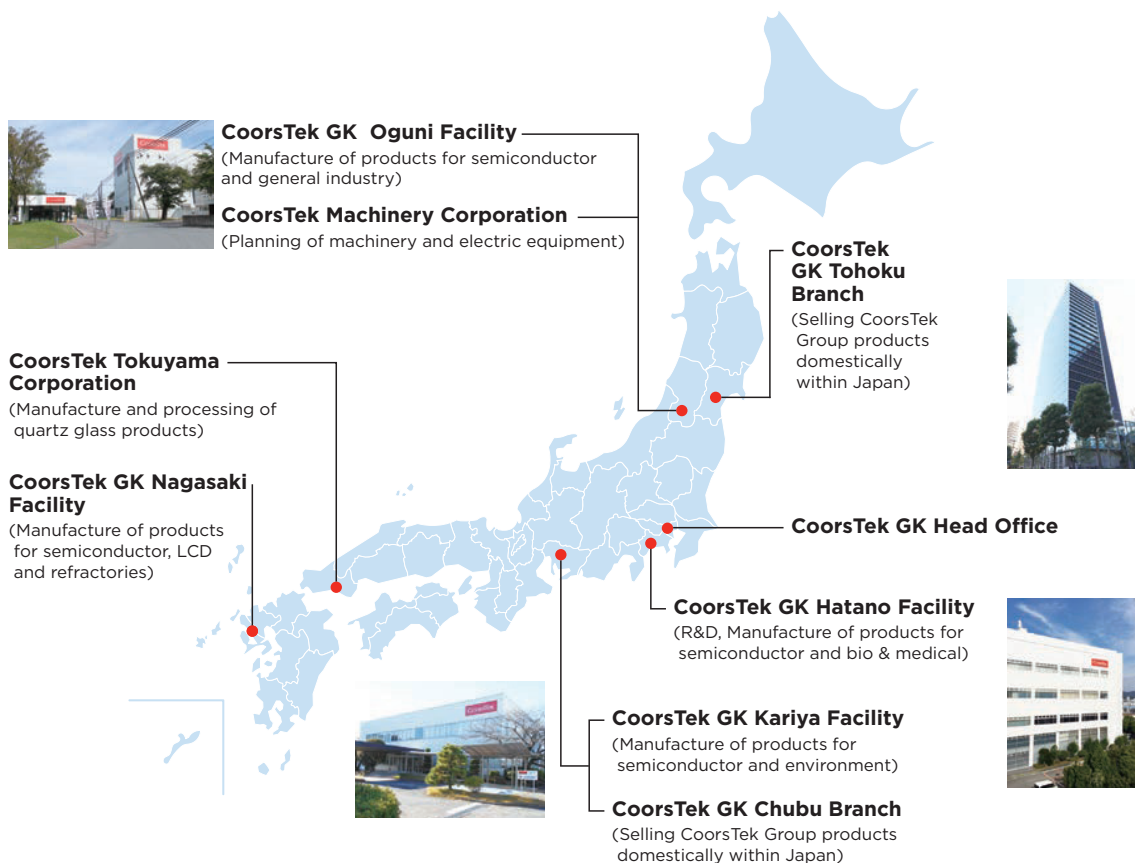
			Quartz Glass/Silica			Alumina		Yttria	
			High-purity quartz glass	High-purity synthetic silica glass	GLASSUN Fused silica refractory	SAPPHAL High-purity translucent alumina	ADS High-purity alumina	EXYRIA High-purity yttria	
Typical Products			Quartz glass	Photomask substrates	Fused silica refractories	Alumina plasma etcher parts	Lapping plates	Yttria plasma etcher parts	
Bulk Density		g/cm ³	2.2	2.2	1.95	3.99	3.9	4.9	
Mechanical Properties	Bending Strength	Room Temp. MPa	105	105	13.1	300	350	110	
		High Temp. MPa	149 900°C	149 900°C	-	-	-	-	
	Young's Modulus	GPa	72	72	-	395	360	170	
	Poisson's Ratio	-	0.17	0.17	-	0.23	0.23	0.30	
	Vickers Hardness	GPa (kgf/mm ²)	9.7GPa (950)	9.7GPa (950)	-	17.7GPa (1770)	16GPa (1600)	6.1GPa (600)	
	Fracture Toughness (K _{1c})	(MPa·m ^{1/2})	-	-	-	4.0	4.5	1.2	
Coefficient of Thermal Expansion		x10 ⁻⁶ /K	0.5 RT~1000°C	0.65 RT~1000°C	0.4 RT~1000°C	8.0 RT~900°C	7.8 RT~900°C	8.2 RT~900°C	
Thermal Properties	Thermal Conductivity	Room Temp. W/(m·K)	1.5	1.4	-	35	30	14	
		High Temp. W/(m·K)	-	3(900°C) (t2.0mm)	1.02(1000°C)	9(1000°C)	8(1000°C)	-	
	Thermal Shock Resistance ΔT _c		>1000	>1000	-	200	220	130	
Max. Use Temperature		°C	1100	1000	1000	1800	1500	2000	
Electrical Properties	Electrical Volume Resistivity		°C	10 ¹⁸	10 ¹⁸	-	10 ¹⁷	10 ¹⁶	10 ¹⁶
	Dielectric Constant		Ω·cm	3.58 1MHz	3.58 1MHz	-	10.1 10GHz	9.9 10GHz	12.0 13.56MHz
	Dielectric Loss (Tan Delta)			1.5x10 ⁻⁴ 1MHz	1.5x10 ⁻⁴ 1MHz	-	1.0x10 ⁻⁴ 10GHz	1.0x10 ⁻³ 10GHz	6x10 ⁻⁴ 13.56MHz

These values are typical and should not be considered as specifications. The characteristic values may vary depending on product shape and conditions of use.

Silicon	Silicon Carbide			Boron Carbide	Carbon			Hydroxyapatite
High-purity single crystal silicon	TPSS High-purity silicon impregnated silicon carbide	CERASIC Sintered silicon carbide	HE766 Recrystallized silicon carbide	Sintered boron carbide	High-purity graphite	CLEAR CARBON High-purity SiC coated graphite	CERAPHITE Robust and sturdy carbon	3D-inter-connected porous structure hydroxyapatite
Silicon focus rings Silicon susceptors	SiC wafer boats SiC process tubes	SiC heat-resistant structural parts SiC polishing plates	SiC setters & sagers	Blasting nozzles	Carbon crucibles Carbon heaters	Carbon susceptors	Carbon air sliders	Ceramic bone substitutes
2.33	3.0	3.15	2.4	2.52	1.88	-	1.40	0.79
~300	260	450	42	400	40	40	90	4.95
-	280 1200°C	450 1450°C	40 1300°C	-	-	-	-	-
190	360	420	160	420~460	10	-	17	-
0.27	0.16	0.18	-	0.21	0.12	-	0.18	-
10.6GPa (1040)	20.4GPa (2000)	23.5GPa (2300)	-	28.6~34.7GPa (2800~3400)	60Hs	-	100Hs	-
-	4.0	3.5	-	3~5	-	-	-	-
3.9 RT~1000°C	4.2 RT~1000°C	4.5 RT~1000°C	4.3 RT~1000°C	4.5 RT~1000°C	4.8 RT~450°C	4.8 RT~450°C	3.2 RT~450°C	-
157	220	170	105	20~40	107	-	-	0.4
-	55(1000°C)	55(1000°C)	-	-	52(1000°C)	-	-	-
-	350	450	-	-	-	-	-	-
1300	1370	1500	1500	-	3000 (inert atmos.)	1500 (inert atmos.)	2000 (inert atmos.)	-
2.4x10 ⁴	10 ⁺¹ ~10 ⁻¹	10 ⁴ ~10 ⁶	-	10 ⁻¹ ~10 ¹	1.1x10 ⁻³	-	5.0x10 ⁻³	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-

COOSTEK IN JAPAN

The CoorsTek group in Japan is headquartered in Shinagawa-ku, Tokyo, and has five manufacturing facilities and three sales offices, and is the core business of global CoorsTek group.



CoorsTek GK

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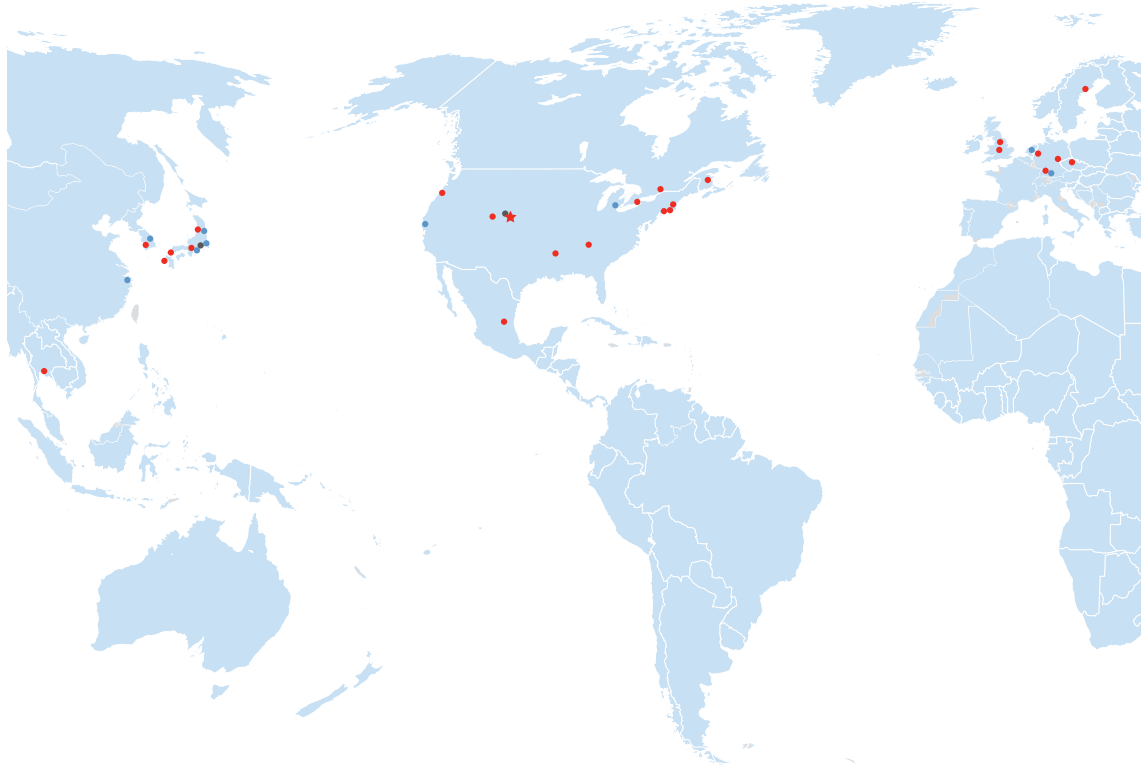
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GLOBAL LOCATION

Global Reach, Local Expertise

CoorsTek connects with customers around the globe by leveraging knowledge and resources across manufacturing facilities and research and development hubs in North America, Europe, and Asia. With over 6,000 team members worldwide, we collaborate our customers to deliver technical ceramic components across multiple industries. Our legacy of innovation and engineering expertise the reason we are the world's leading manufacturer of technical ceramic components and the partner of choice for our customers.



- ★ Corporate Headquarters
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- R&D Hub and Manufacturing Facility
- Sales Office

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