

WEIFANG ZHONGJIA

SILICON CARBIDE TECHNOLOGY CO., LTD.

潍坊中加碳化硅科技有限公司

**CUTTING-EDGE TECHNOLOGY
PRECISION MANUFACTURING**
PROVIDER OF HIGH-QUALITY SILICON CARBIDE SOLUTIONS

尖端技术、精密制造
高品质碳化硅解决方案提供商



潍坊中加碳化硅科技有限公司

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About Us

企业简介

潍坊中加碳化硅科技有限公司成立于2016年，是潍坊碳化硅陶瓷行业协会副理事长单位。本公司是一家专业生产碳化硅陶瓷制品的高科技企业，已通过ISO9001质量管理体系和ISO14001环境管理体系认证。公司目前有无压烧结碳化硅(SSiC)和反应烧结碳化硅(SiSiC)两大系列产品，被广泛应用于矿山、冶金、电力、窑炉、机械、钢铁、新能源、环保、半导体、航空航天等领域。公司先后获得高新技术企业、创新型中小企业、山东省“专、精、特、新”中小企业等荣誉称号。

潍坊中加碳化硅始终秉持“诚信立足、创新致远”的经营理念，为广大客户提供优质的服务和质量过硬的产品，愿成为您最可信赖的合作伙伴。

Weifang Zhongjia Silicon Carbide Technology Co., Ltd. was founded in 2016, As the deputy director unit of the Weifang Silicon Carbide Ceramics Industry Association, our company is a high-tech enterprise specializing in the production of silicon carbide ceramic products. We have obtained certifications for both the ISO9001 Quality System and the ISO14001 Environmental Management System. Currently, our company offers two major series of products: pressureless sintered silicon carbide (SSiC) and reaction bonded silicon carbide (SiSiC), which are widely used in mines, metallurgy, power generation, kilns, machinery, steel production, new energy, environmental protection, semiconductors, aerospace, and other fields. Our company has successively been awarded honorary titles such as High-tech Enterprise, Innovative Small and Medium-sized Enterprise, and Shandong Provincial “Specialized, Fine, Unique, and Innovative” Small and Medium-sized Enterprise.

Always adhering to the business philosophy of “establishing a foothold with integrity and innovating for the future”, Weifang Zhongjia Silicon Carbide is committed to providing our customers with high-quality services and excellent products. We aspire to become your most trusted partner.

SiSiC Properties

反应烧结 碳化硅陶瓷制品特性

反应烧结碳化硅具有高强度、高硬度、高耐磨、耐高温、耐腐蚀、抗氧化性好、抗热震性好、导热好、耐急冷急热和抗高温蠕变等基本特性和主要特点。可制成横梁、辊棒、冷风管、热电偶保护管、测温管、喷火嘴、耐磨件、耐腐蚀件、密封件及各种异型结构件等。

SiSiC has high strength, high hardness, high abrasion resistance, high temperature resistance, corrosion resistance, good oxidation resistance, good thermal shock resistance, good thermal conductivity, rapid cooling and rapid heat resistance and high temperature creep resistance, etc. It can be made into beam, roller, cooling air pipe, thermocouple protection pipe, temperature measuring pipe, burner nozzle, wear-resisting parts, corrosion-resisting parts, sealing parts and a variety of special-shaped structural parts.

SSiC Properties

无压烧结 碳化硅陶瓷制品特性

无压烧结碳化硅相比反应烧结碳化硅而言,因其材料中没有游离硅存在，所以其具有更高纯度、更优异的力学性能、更突出的耐腐蚀性（可耐强酸、强碱腐蚀，也是唯一可耐氢氟酸腐蚀的陶瓷材料）、更高的耐磨性，可在其他材料不能满足的环境中使用，服役寿命更长。

Compared with SiSiC, SSiC contains no free silicon in its material. Therefore, it offers higher purity, superior mechanical properties, more outstanding corrosion resistance (resistant to strong acids and alkalis, and is the only ceramic material that can withstand hydrofluoric acid corrosion), and higher wear resistance. It can be used in environments where other materials fail, and has a longer service life.



3D Printing

3D打印

3D打印是碳化硅构件的新一代成型工艺，无需开模，可高效制备大尺寸、复杂异形、深内腔、多孔、超薄壁等传统方法难以成型甚至无法制造的结构，摆脱脱模限制，实现结构自由设计；尺寸精度更高，性能一致性与稳定性更优。

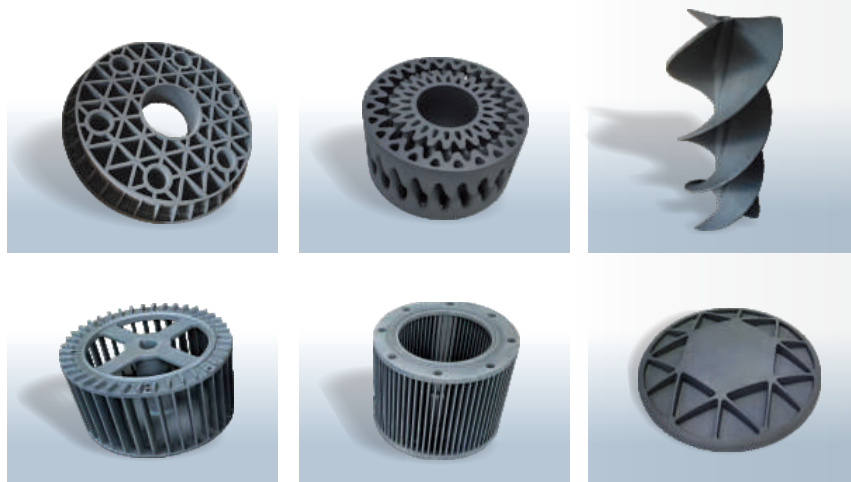
本厂配备多台大尺寸碳化硅专用3D打印设备，可承接小批量定制与规模化量产，灵活适配多规格及订单波动，是高端碳化硅制品快速落地的优选方案。

3D printing, a mold-free forming process for SiC components, enables large, complex, deep-cavity, porous, and ultra-thin-wall structures that are difficult or impossible with conventional methods. It offers design freedom, higher accuracy, and better consistency.

Our factory is equipped with multiple large-format SiC-specific 3D printers, supporting both small-batch custom orders and mass production — flexibly adapting to various specifications and volume fluctuations. The ideal solution for rapid deployment of high-end SiC products.



3D 打印产品
3D-printed products



3D 打印机
3D Printer

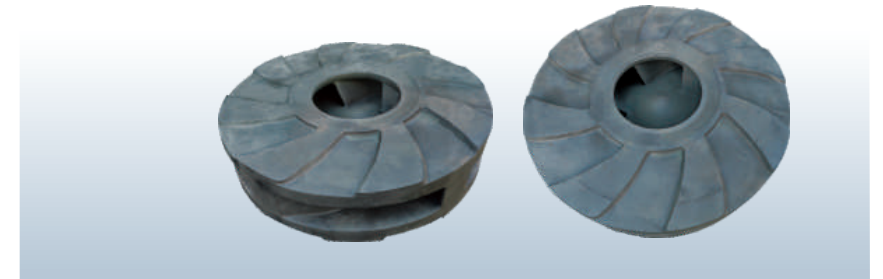
SiSiC Pump Components

碳化硅泵件

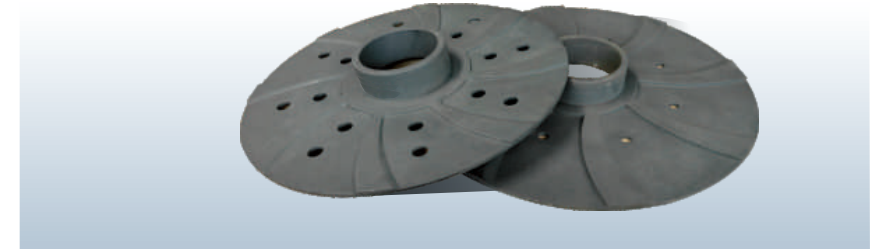
碳化硅泵件相较于传统金属泵，凭借极高的硬度和化学稳定性，在耐磨和耐腐蚀性能上优势显著，其使用寿命通常为金属泵的3-10倍，运行效率持久稳定，维护频率和停机损失大幅降低，是高磨损、高腐蚀场景下的理想选择。

Compared with traditional metal pumps, silicon carbide pump components offer significant advantages in wear resistance and corrosion resistance due to their extremely high hardness and chemical stability. Their service life is typically 3 to 10 times that of metal pumps, with consistent and stable operational efficiency, and greatly reduced maintenance frequency and downtime losses, making them an ideal choice for high-wear and high-corrosion applications.

叶轮
Pump Impeller



碳化硅叶轮盖板
SiSiC Impeller Cover



碳化硅护板
SiSiC Guard Plate



渣浆泵壳内衬
The Lining Of The Slurry
Pump Housing



旋流器内衬
Hydrocyclone Liner



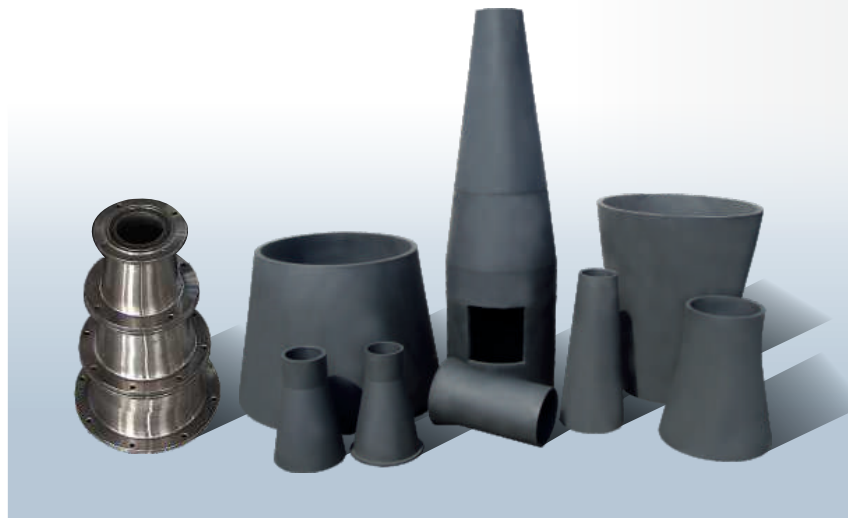
SiSiC Wear-resistant Products

耐磨产品

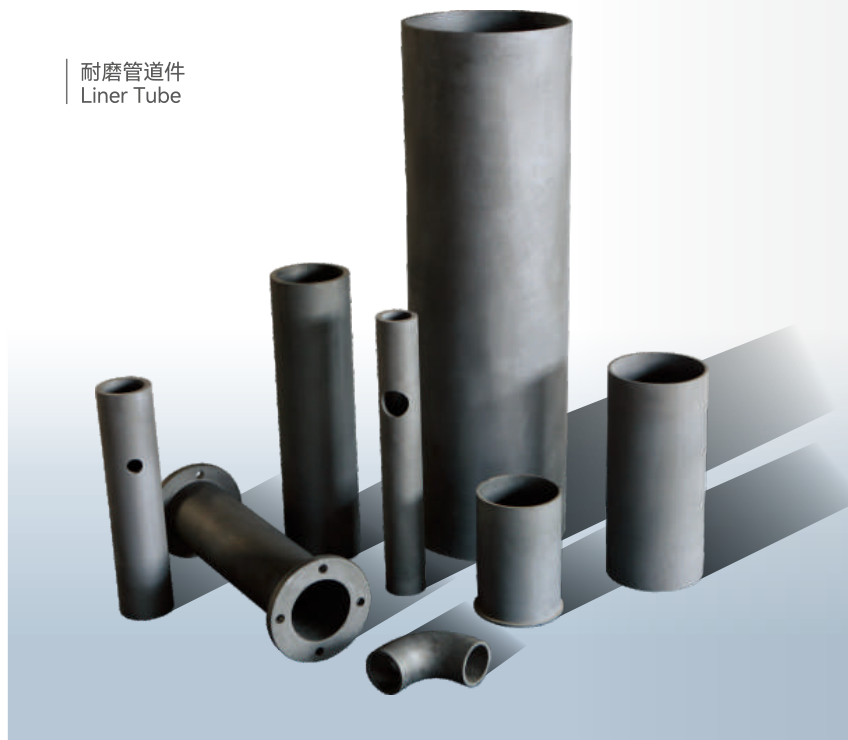
碳化硅耐磨系列产品以其高硬度和耐磨性而著称，能够在高磨损环境中长时间保持形状和功能。同时，其出色的抗腐蚀性使得它在腐蚀性环境中也能保持稳定性能。此外，长寿命、易加工安装以及耐高温等特点，进一步降低了更换和维护成本，提高了工作效率，使得碳化硅耐磨产品成为工业领域的优选材料。

The carbide silicon wear-resistant series of products are renowned for their high hardness and wear resistance, enabling them to maintain their shape and function for extended periods in high-wear environments. Additionally, their excellent corrosion resistance ensures stable performance even in corrosive environments. Features such as long lifespan, ease of processing and installation, as well as high temperature resistance, further reduce replacement and maintenance costs, enhance work efficiency, and establish carbide silicon wear-resistant products as preferred materials in the industrial sector.

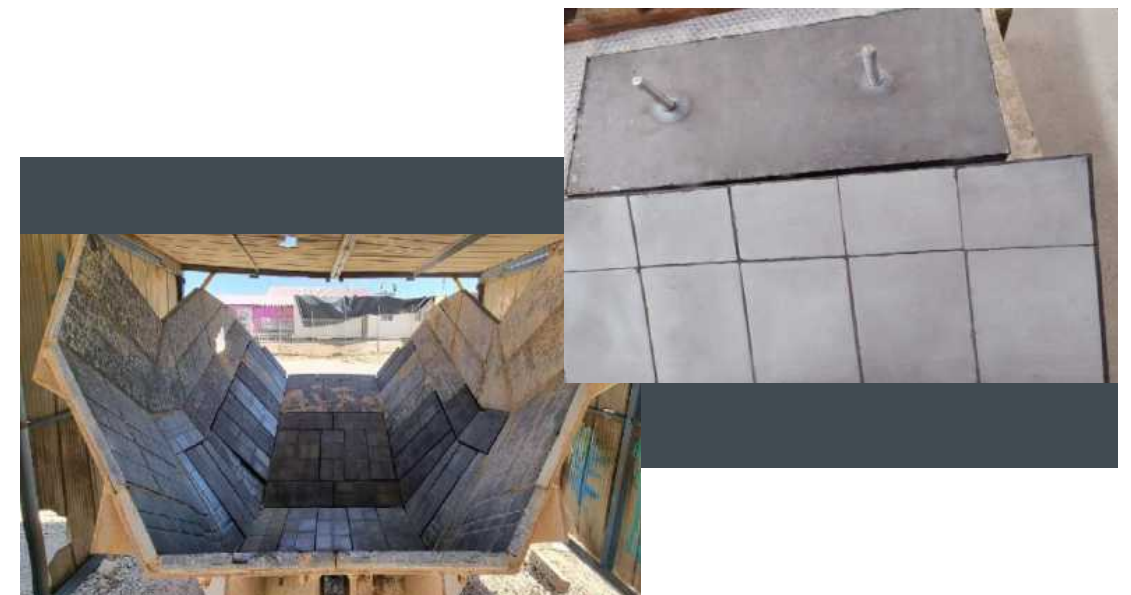
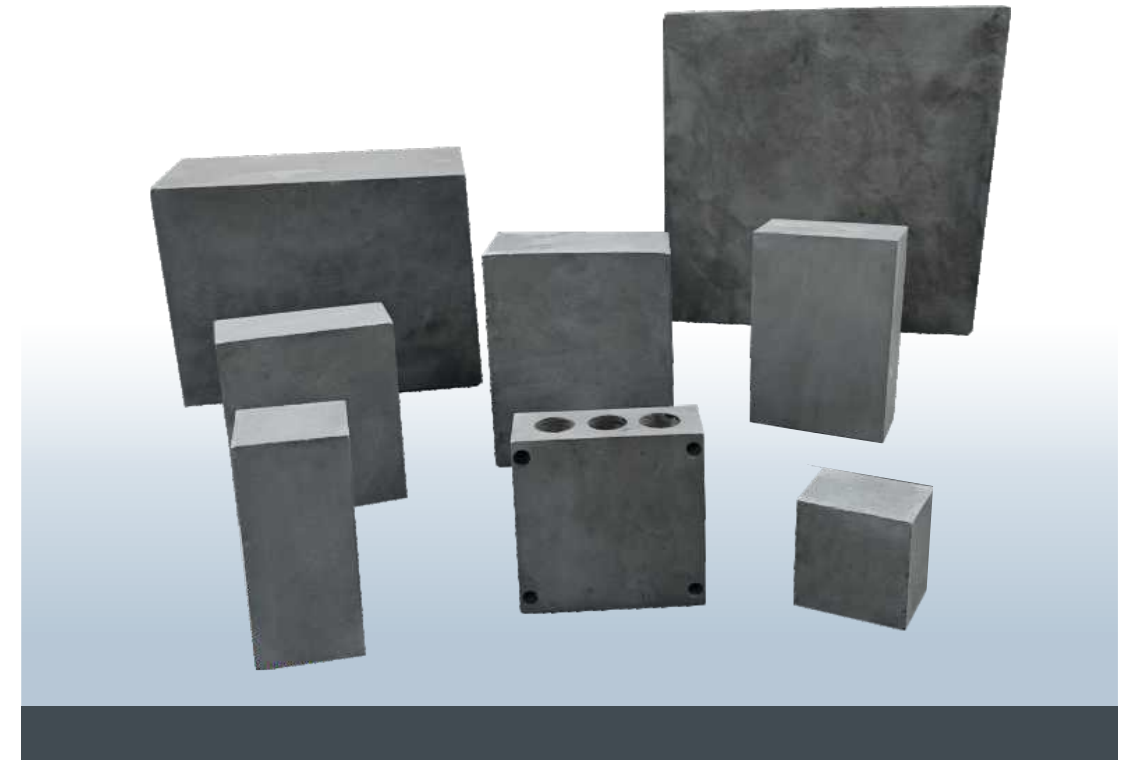
耐磨衬套件
Ceramic Bush



耐磨管道件
Liner Tube



耐磨砖块、衬板
Wear-Resistant Bricks And Liners



Silicon Carbide Composite Polyurethane Bushing

碳化硅复合聚氨酯衬套

聚氨酯碳化硅衬套相比单纯的碳化硅衬套，优势显著：

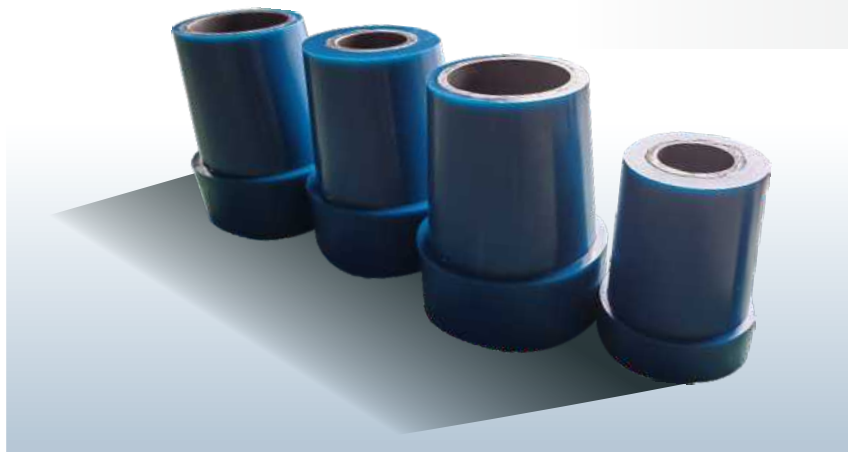
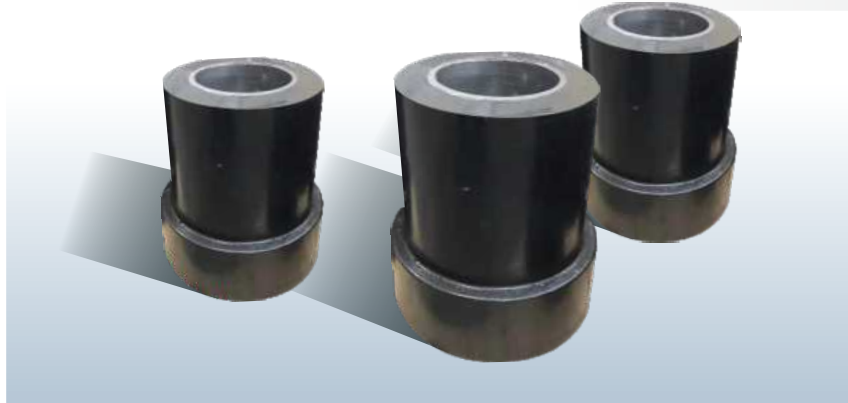
- 1.弹性和减震性能优越，降低噪音和振动，提高设备稳定性。
- 2.抗冲击和耐磨损能力强，延长使用寿命。
- 3.密封性和耐腐蚀性良好，适用于防介质泄漏和耐腐蚀场合。
- 4.加工和安装更灵活方便，适应不同形状和尺寸需求。

然而，在极高温度或特定化学环境下，碳化硅衬套仍具优势。因此，选择时需综合考虑应用场景和需求。

Compared to carbide silicon liners, polyurethane carbide silicon liners have significant advantages:

- 1.Superior elasticity and shock absorption performance, reducing noise and vibration, and improving equipment stability.
- 2.Strong impact resistance and wear resistance, extending service life.
- 3.Good sealing and corrosion resistance, suitable for preventing medium leakage and corrosion-resistant occasions.
- 4.More flexible and convenient processing and installation, adapting to different shapes and size requirements.

However, carbide silicon liners still have advantages in extremely high temperature or specific chemical environments. Therefore, when choosing, it is necessary to comprehensively consider the application scenarios and requirements.

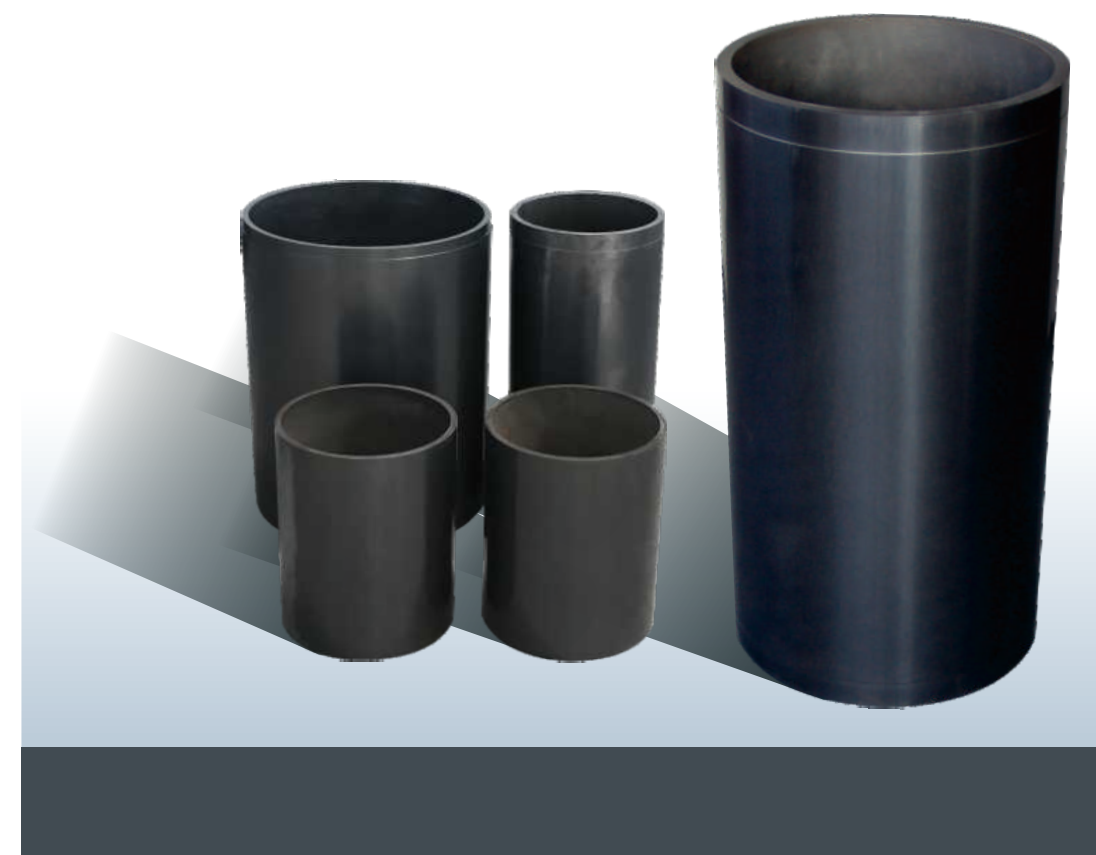


SiSiC Sand Mill Inner Barrel

砂磨机内桶

碳化硅陶瓷砂磨机内桶具有重量轻、硬度高、耐腐蚀、耐高温等特性,比传统的氧化锆陶瓷更耐冲刷和磨损(极低的磨耗量可防止物料污染)。导热系数为 $130\text{W/M}\cdot\text{K}(20^{\circ}\text{C})$ ，是散热效果最好的陶瓷材料，有利于设备运行过程中对温升的控制。

The SiSiC inner barrel of a sand mill features light weight, high hardness, corrosion resistance, and high temperature resistance. Compared with traditional zirconia ceramics, it offers better resistance to erosion and wear (extremely low wear rate prevents material contamination). With a thermal conductivity of $130\text{ W/m}\cdot\text{K}$ (at 20°C), it is the ceramic material with the best heat dissipation performance, which helps control temperature rise during equipment operation.



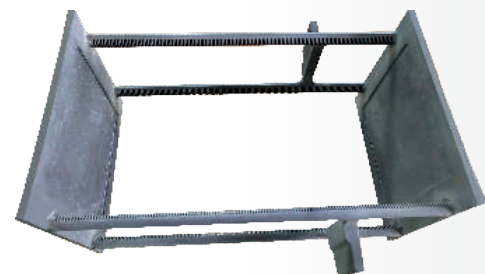
SiSiC Photovoltaic Auxiliary Products

光伏配套产品

碳化硅舟托应用于光伏电池片扩散设备，替代传统石英舟托。较传统石英舟托相比，具有承载能力强、耐高温、耐腐蚀、耐蠕变等优异性能。

Silicon carbide bracket are applied to photovoltaic cell diffusion equipment, replacing traditional quartz boat supports. Compared with traditional quartz boat supports, they have excellent performance in strong bearing capacity, high temperature resistance, corrosion resistance, creep resistance, etc.

晶舟
Crystal Boat



舟托
Bracket



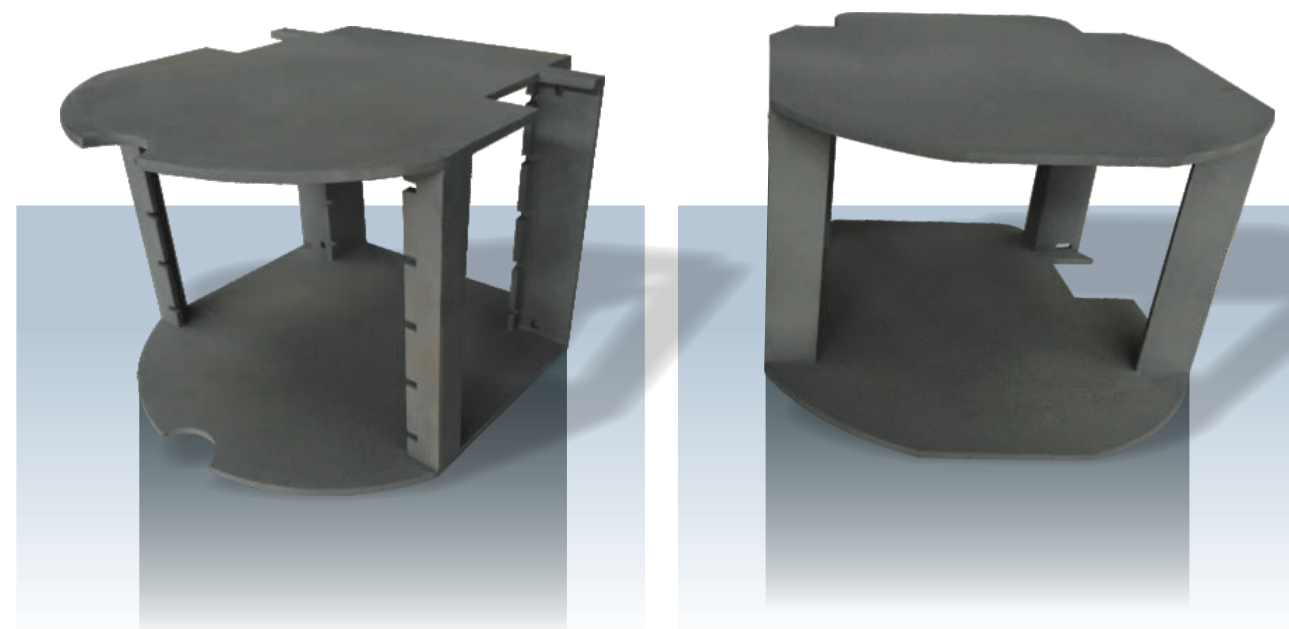
碳化硅悬臂桨具有承载能力强、优异的抗弯强度，耐高温耐腐蚀等特点，是光伏电池片装载系统的关键部件。

SiC cantilever paddles, with strong carrying capacity, excellent bending strength, high temperature resistance, corrosion resistance and other characteristics, are the key components of photovoltaic cell loading systems.

悬臂桨
Cantilever Paddles



匀流桶
SiSiC Gas Distribution Bucket



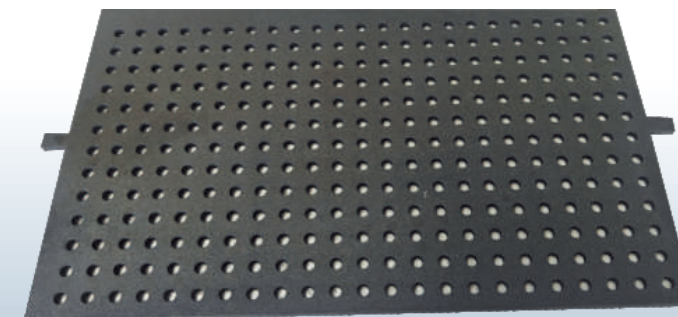
碳化硅匀流桶耐高温腐蚀，用于光伏扩散设备中均匀分布气流，提升镀膜与掺杂一致性。

SiSiC gas distribution barrel is resistant to high temperature and corrosion, used in photovoltaic diffusion equipment to evenly distribute gas flow, improving coating and doping uniformity.

碳化硅匀流板用于光伏电池片制程，优化气流分布，增强工艺均匀性，延长设备寿命。

SiSiC gas distribution plate for PV manufacturing, optimizes gas distribution, enhances process uniformity, and extends equipment lifespan.

匀流板
SiSiC Gas Distribution Plate



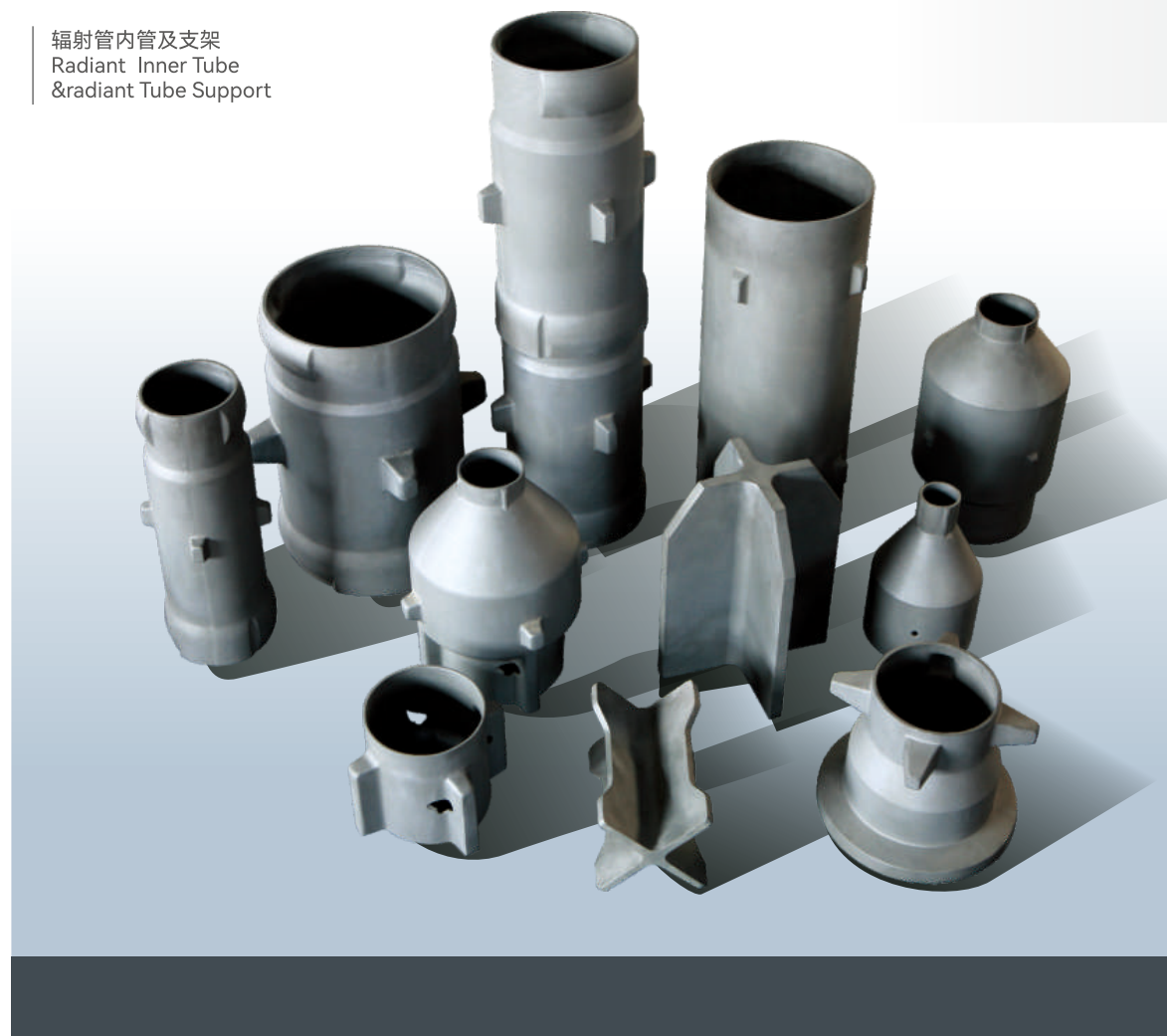
SiSiC Radiation Pipe

辐射管

碳化硅辐射管具有耐高温，导热好，耐急冷急热，抗氧化，抗热震性好，使用寿命长，是钢铁冶炼行业最理想的隔焰导热材料。

SiSiC radiation pipe is high temperature tolerance, high thermal conductivity, low coefficient of thermal expansion, oxidation resistance, thermal shock resistance, long application life. They are the best materials in steel metallurgy industry.

辐射管内管及支架
Radiant Inner Tube
& radiant Tube Support



辐射管外管
Outer Tube



SiSiC Heat Exchanger

换热器



SiSiC/SSiC Roller

辊棒

反应烧结碳化硅辊棒 SiSiC Rollers

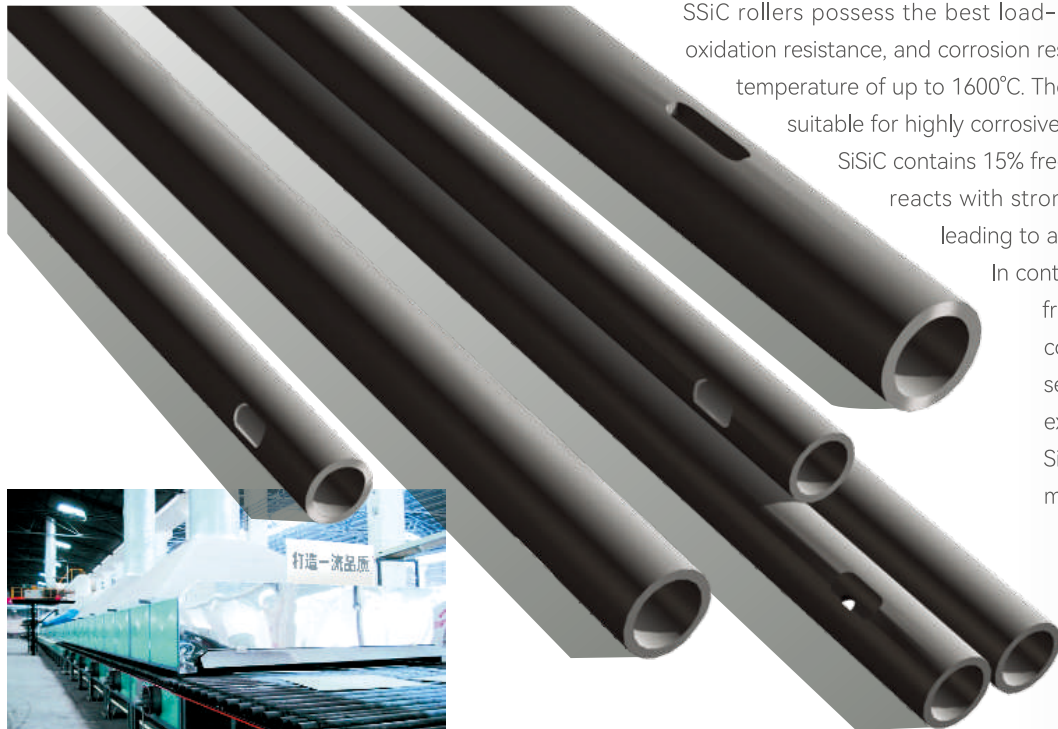
反应烧结碳化硅辊棒抗氧化、高温承载力大、长期使用不变形，使用寿命是氧化铝陶瓷辊棒的10-15倍，适用于日用瓷、卫生瓷、建筑瓷、磁性材料及新能源电池材料等辊道窑的高温烧成带。

The SiSiC rollers are oxidation resistance, high bending strength under high temperature ,no deformation for a long application time.Service life is 10-15 times more than Alumina roller. They can be made as perfect kiln-furniture for roller hearth kiln in the field of domestic ceramics, sanitary ceramics, building ceramics , magnetic materials and new energy battery materials.

无压烧结碳化硅辊棒 SSiC Rollers

压烧结碳化硅辊棒具备最优的承载力、抗氧化性和耐腐蚀性，使用温度可达1600℃特别适用于强腐蚀性的工作环境。反应烧结碳化硅因含有15%的游离硅，易与强碱反应导致寿命缩短。而无压烧结碳化硅不含游离硅，SiC含量≥99%，使用寿命相比反应烧结大大延长，显著降低维护成本。

SSiC rollers possess the best load-bearing capacity, oxidation resistance, and corrosion resistance, with a service temperature of up to 1600°C. They are especially suitable for highly corrosive working environments. SiSiC contains 15% free silicon, which easily reacts with strong alkaline gases, leading to a shortened service life. In contrast, SSiC contains no free silicon, with a SiC content of ≥99%, and its service life is significantly extended compared to SiSiC, greatly reducing maintenance costs.



SiSiC/SSiC Beam

方梁

反应烧结碳化硅方梁 SiSiC Beam

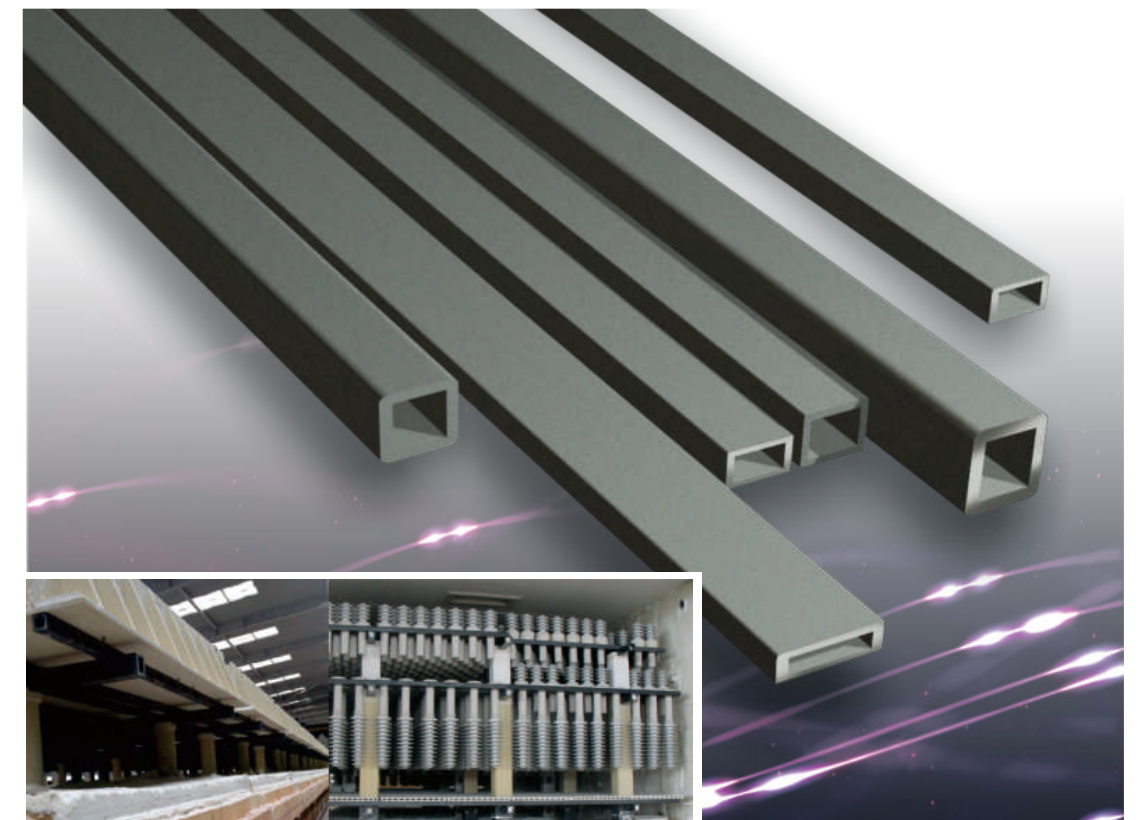
反应烧结碳化硅方梁具有抗氧化，高强度，长期使用不变形等特点。横梁是梭式窑，隧道窑，双层窑及其他工业窑炉的承重支架；

The SiSiC beams have series of characteristic such as oxidation resistance, high bending strength , no deformation for a long application time. SiSiC Beams are applicable to shuttle kiln, two-stage roller hearth kiln and other industrial kiln.

无压烧结碳化硅方梁 SSiC Beam

无压烧结方梁相较于反应烧结方梁在表面质量、密度、强度及化学稳定性等方面均表现出显著优势，在特定场景中能够更好地满足高性能要求。

Compared to SiSiC beams, SSiC beams, pressure-free sintered square beams exhibit significant advantages in terms of surface quality, density, strength, and chemical stability, making them better suited for high-performance requirements in specific scenarios.



SiSiC Burner Nozzle

喷火嘴

燃烧器喷火嘴是各种燃气，燃油等工业窑炉理想的燃烧室，尤其各式分火器对宽体窑和温差要求较高的工业窑炉，能有效的控制窑炉温差。

The SiSiC burner Nozzles are the best parts for all kinds of kilns which are used gas or oil, especially for the industrial furnace to separate fire as a machine which is be high requested on broad of furnace and different temperature. They can control temperature effectively.



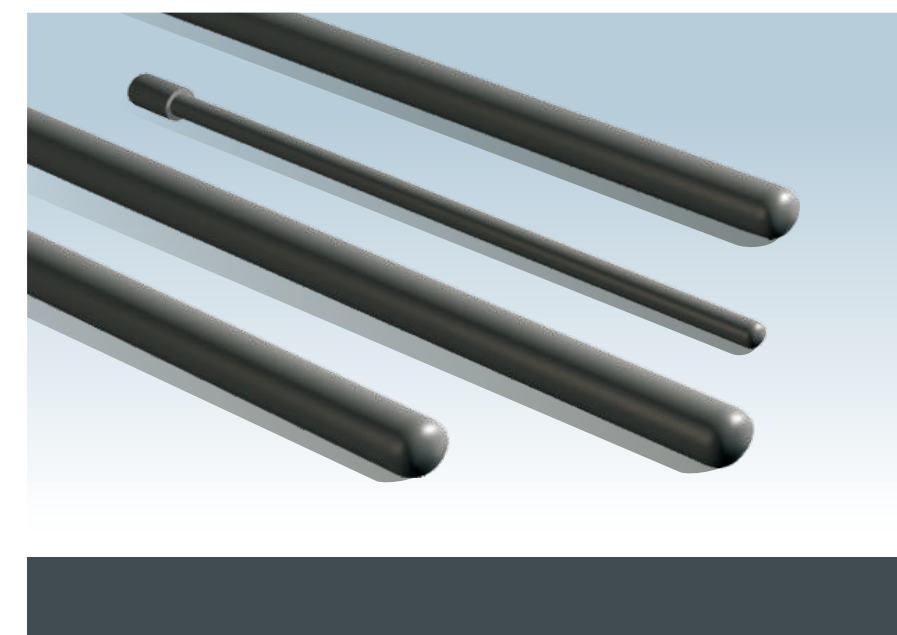
SiSiC Cooling Air Pipe

冷风管



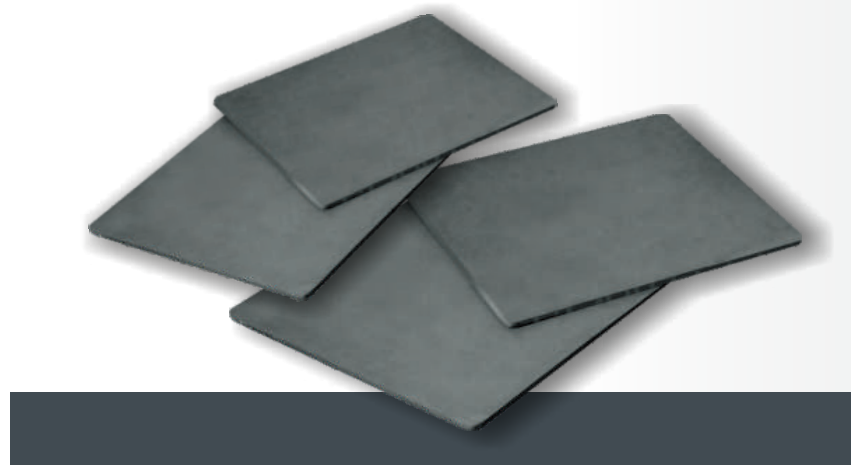
SiSiC/SSiC Thermal Couple Protection Tube

热电偶保护管



SiSiC Batt

板材



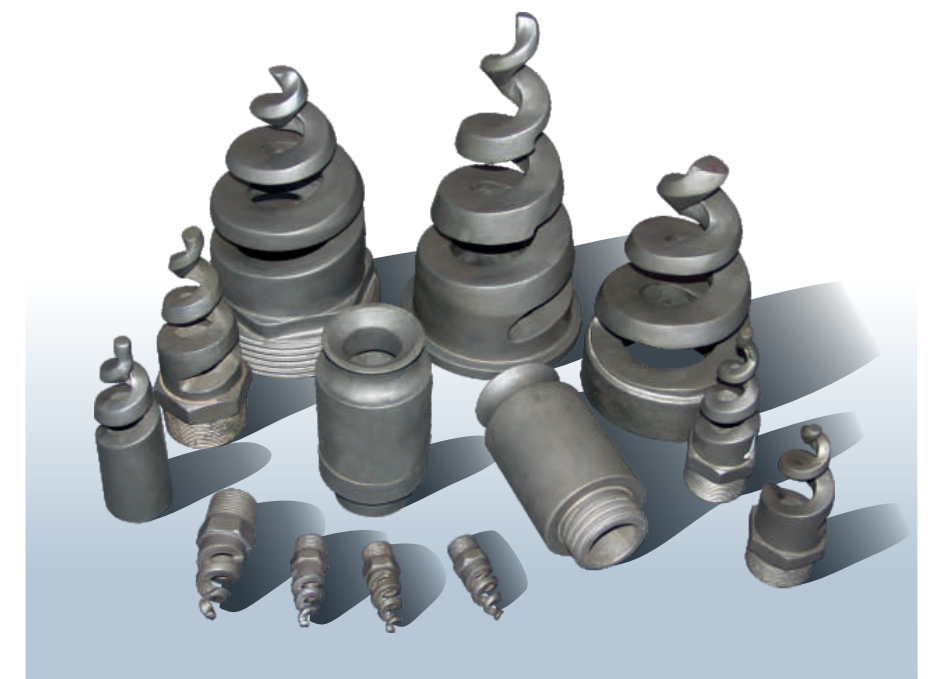
SiSiC/SSiC Crucible. Sagger

坩埚、匣钵



SiSiC Desulfurization Spray Nozzle

脱硫喷嘴



螺旋喷嘴
Spiral Nozzles

单向喷嘴
Single Direction Nozzles



双向喷嘴
Double Direction Nozzles



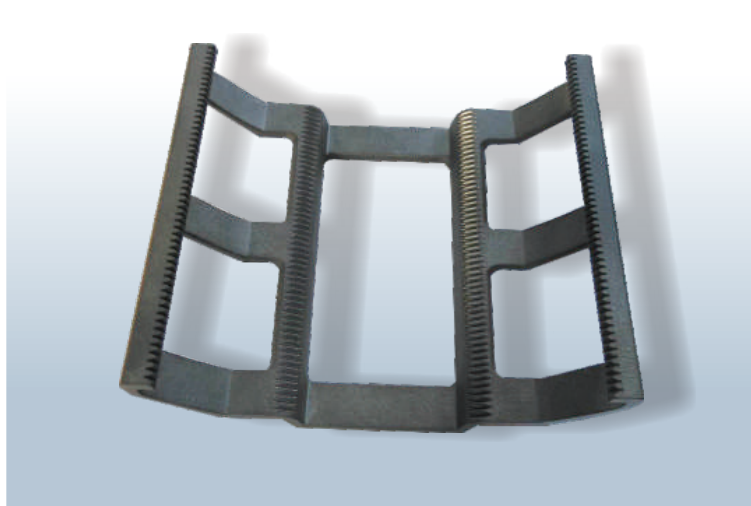
Precision Silicon Carbide Ceramics Parts For Semiconductor Equipment

半导体设备应用精密碳化硅陶瓷件

电机支架
Motor Bracket



晶舟
Wafer Boat



导轨
Guide Frame



炉管
Kiln Tubes

碳化硅炉管常应用于半导体高温工艺，包括氧化、扩散、退火及薄膜沉积，具有耐高温、寿命长、纯度高等优势。

SiSiC furnace tubes are used in semiconductor high-temperature processes, including oxidation, diffusion, annealing, and thin-film deposition, offering high heat resistance, long service life, and ultra-high purity.



吸盘
Chuck



反射镜基板
Reflector Substrate





Parameter Comparison

不同材料碳化硅陶瓷制品参数比较

项目 Item	单位 Unit	指标 Data			
		反应烧结碳化硅 RBSiC(SiSiC)	氮化硅结合碳化硅 NBSiC	无压烧结碳化硅 SSiC	重结晶碳化硅 RSiC
碳化硅含量 SiC content	%	85	80	99	98.5
游离硅含量 Free Silicon content	%	15	0	0	0
最高使用温度 Max service temperature	°C	1380	1550	1600	1650
密度 Density	g/cm³	3.02	2.72	3.10	2.60-2.74
气孔率 Open porosity	%	0	12	0	15
抗弯强度 Bending strength	20°C	250	160	380	100
	1200°C	280	180	400	120
弹性模量 Modulus of elasticity	20°C	330	220	420	240
	1200°C	300	/	/	200
热传导系数 Thermal conductivity	1200°C	45	15	74	10
热膨胀系数 Coefficient of thermal expansion	K-1x10-6	4.5	5.0	4.1	4.8
维氏硬度 HV	kg/m ^{m2}	2500	2500	2800	/

Test Data

不同材料 液体腐蚀测试数据

测试环境 Test Environment		腐蚀性失重 Corrosive weight loss (mg/cm²yr)			
试剂浓度 (wt%) conc.Reagent	温度 (°c) temperature	无压烧结碳化硅 (不含硅) SSiC (No Free Si)	反应烧结碳化硅 (含12%硅) RBSiC(SiSiC) SiC (12% si)	碳化钨 (6%钴) Tungsten carbide (6% Co)	氧化铝 (99%) Aluminum OXide (99%)
98%H ₂ SO ₄	100	1.8	55.0	>1000	65.0
50%NaOH	100	2.5	>1000	5.0	75.0
53%HF	25	<0.2	7.9	8.0	20.0
85%H ₃ PO ₄	100	<0.2	8.8	55.0	>1000
70%HNO ₃	100	<0.2	0.5	>1000	7.0
45%KOH	100	<0.2	>1000	3.0	60.0
25%HCl	70	<0.2	0.9	850	72.0
10%HF & HNO ₃	25	<0.2	>1000	>1000	16.0

Explain 备注

■ 测试时间 Test Time:

浸水125到300小时测试，不断搅拌。
125 to 300 hours of submersive testing, continuously stirred.

■ 腐蚀失重指南 Corrosion Weight Loss Guide:

>1000 mg/cm² yr	几天内完全破坏	Completely destroyed within days.
100 to 999 mg/cm² yr	不推荐使用超过一个月	Not recommended for servicegreater than a month
50 to 100 mg/cm² yr	不推荐使用超过一年	Not recommended for servicegreater than one year
10 to 49 mg/cm² yr	谨慎使用，基于特定的应用	Caution recommended, basedon the specific application.
03 to 9.9 mg/cm² yr	推荐长期使用	Recommended for long term service
<2 mg/cm² yr	推荐长期使用，基本无腐蚀	Recommended for long term service; no corrosion, other than as a result of surface cleaning, was evidenced.