



The leading manufacturer  
and supplier of SiC coating

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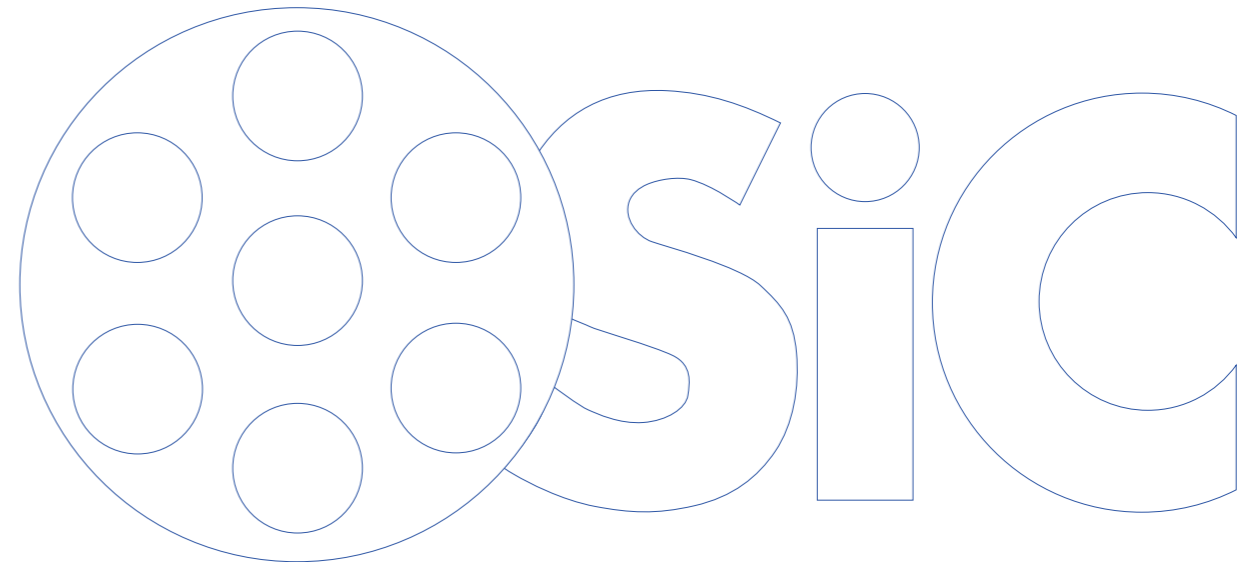
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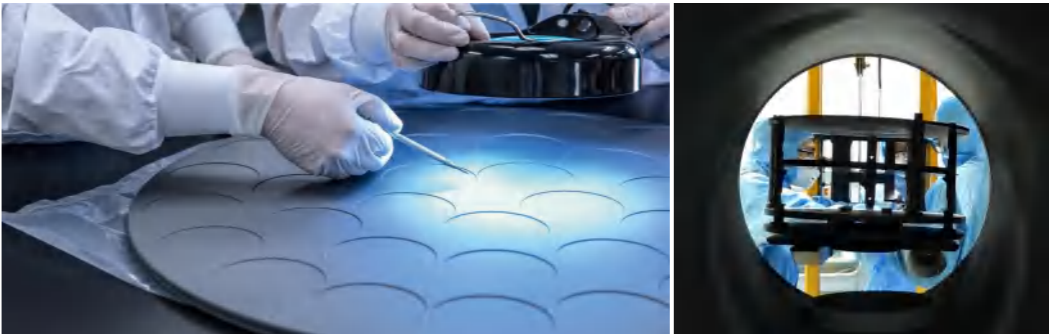


# VET ENERGY CARBON

Materials Change The Future



Materials Change The Future



# ABOUT VET ENERGY

Ningbo VET Energy Technology Co., Ltd is a professional manufacturer for graphite parts, especially in development of new semiconductor materials and focusing on the research and development of SiC coating. The company's main products are SiC-coated susceptors for LED industry and monocrystalline silicon industry. The SiC film used for LED industry and monocrystalline silicon industry is cubic phase, which has the same lattice structure as diamond, and its hardness is only as good as diamond. Silicon carbide is the most mature wide band gap semiconductor material, and has broad application prospects in the semiconductor industry. In addition, silicon carbide has a high thermal conductivity, a small thermal expansion coefficient, high temperature resistance (about 2700 degrees Celsius), and excellent corrosion resistance. The company's silicon carbide coating products are also widely used in aerospace, photovoltaic industry, nuclear energy, high-speed rail, automotive and other industries.



## COOPERATIVE R & D INSTITUTIONS



Chinese Academy of Sciences



National Institute of Materials  
(NIMS)



Hiroshima University



Beijing University  
of Aeronautics and  
Astronautics



AVIC 601  
AVIC Nanjing  
Electromechanical

## STRATEGIC SUPPORTING PARTNERS

- Huacan Optoelectronics Co., Ltd.
- Sanan Optoelectronics Co., Ltd.
- Jiangsu Yixing Derong Technology Co., Ltd.
- Korea TVC Technology Co., Ltd.
- Wuhan Youweixing Technology Co., Ltd.
- Zhejiang Eagle Semiconductor Technology Co., Ltd.



HC SEMITEK



San'an Optoelectronics



UV LEDTEK



德融科技  
DR TECHNOLOGY

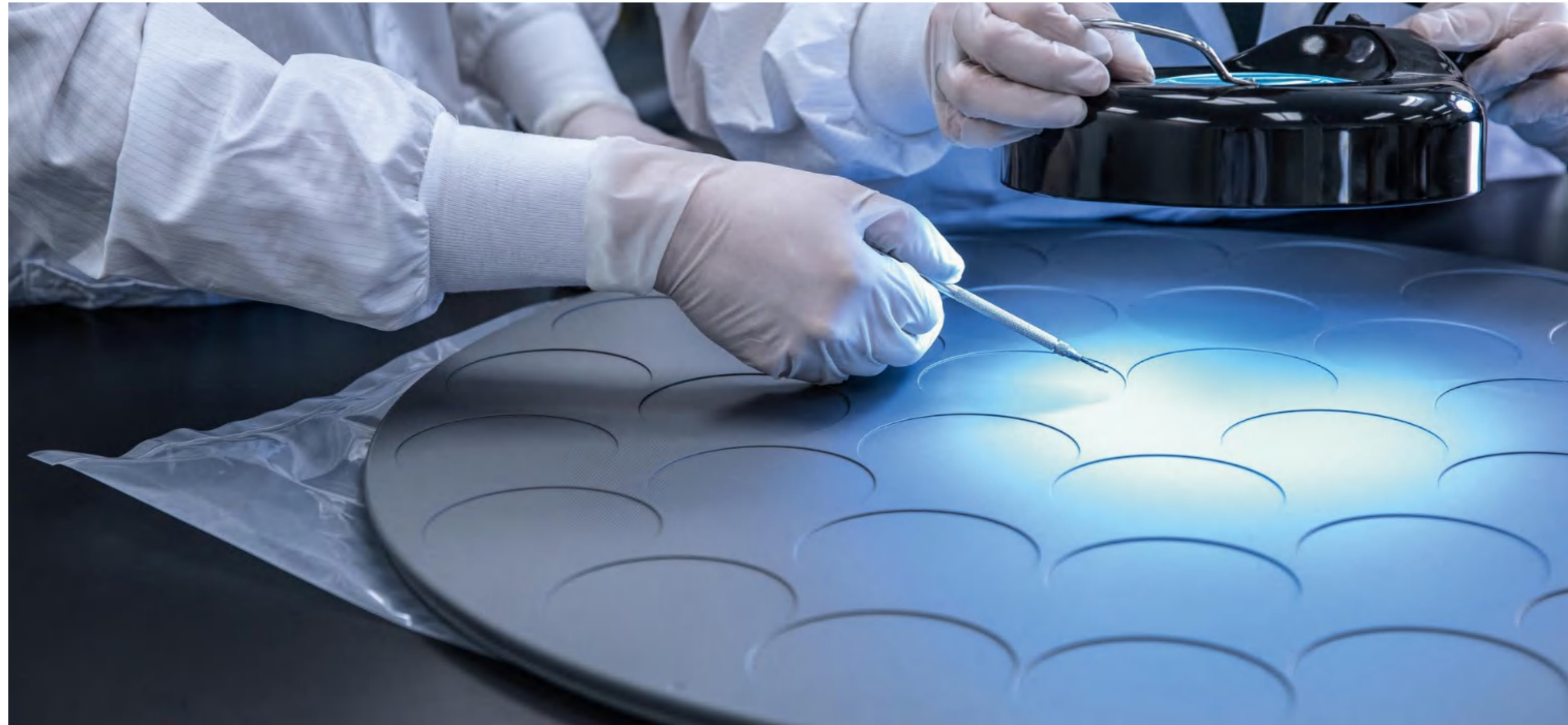


VTC  
KOREA VAC-TEC CO.,LTD.

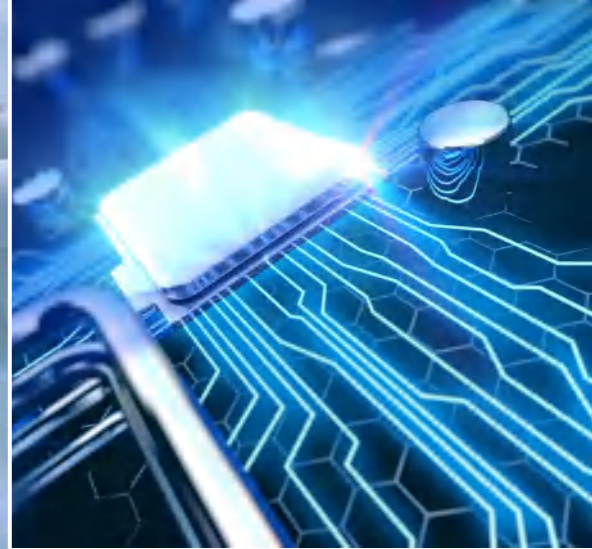
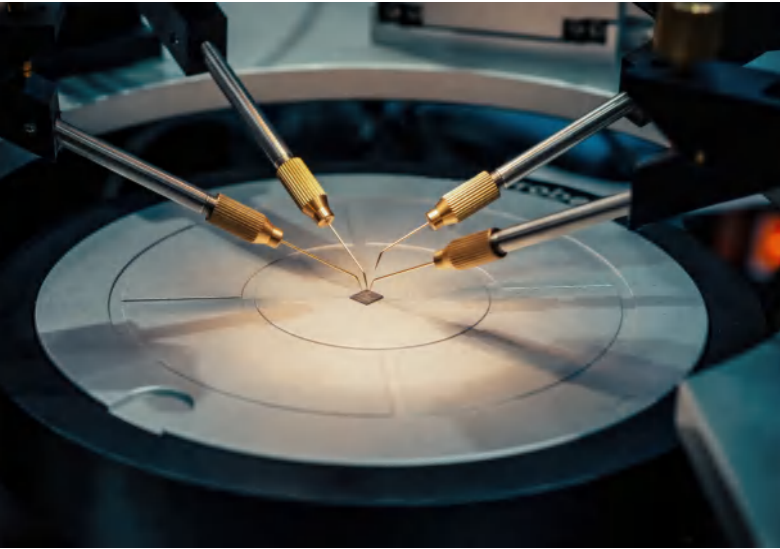


## INDUSTRY OUTLOOK

Silicon carbide (SiC) is a new compound semiconductor material. Silicon carbide has a large band gap (about 3 times silicon), high critical field strength (about 10 times silicon), high thermal conductivity (approximately 3 times silicon). It is an important next-generation semiconductor material. SiC coatings are widely used in the semiconductor industry and solar photovoltaics. In particular, the susceptors used in the epitaxial growth of LEDs and Si single crystal epitaxy require the use of SiC coating. Due to the strong upward trend of LEDs in the lighting and display industry, and the vigorous development of the semiconductor industry, SiC coating product prospects are very good. The SiC coating technology currently used in the semiconductor industry is mainly controlled by foreign companies, and the domestic market is basically monopolized by imported products. Based on long-term technology accumulation, our company develops SiC coating technology to realize the localization of SiC coating products and replace foreign imports. This has not only economic value but also social value in the current international environment in which China is located.







## APPLICATION FIELD

SiC coatings are widely used in the semiconductor industry and solar photovoltaics. In particular, the susceptors used in the epitaxial growth of LEDs and Si single crystal epitaxy require the use of SiC coating. Due to the strong upward trend of LEDs in the lighting and display industry, and the vigorous development of the semiconductor industry, SiC coating product prospects are very good.

## PRODUCT SOLUTIONS

MOCVD susceptors	Semiconductor Industry
Monocrystalline silicon epitaxial susceptors	Semiconductor Industry
Plasma etching disk	Semiconductor Industry
Solar photovoltaic products	Solar photovoltaic
Silicon carbide products such as heaters, crucibles, molds, fixtures	

## GRAPHITE BASE 7 AND 45 EPITAXIAL BASE



### Product application and performance

Si single crystal industry, GaN, AlN, sapphire and other MOCVD pedestals. Main performance: high purity, erosion resistance, high thermal conductivity, high temperature resistance, low thermal expansion coefficient.

### Product applications and uses

- Graphite base coating for single crystal silicon epitaxial growth
- MOCVD process, graphite base coating for GaN epitaxial growth



Diameter 465, wafer pit diameter 100mm, depth 0.885mm



Coating thickness 100um ~ 150um



14 pits for k465 and other models

### Comparison of material properties

	Al2O3	Silicon	Silicon carbide
Thermal conductivity	46	150	490
Expansion coefficient	1.9	5 ~ 20	-1.4
Stability	Fair	Good	Good
Thermal conductivity	Poor	Good	Good
Cost	Medium	Low	High
ESD	Fair	Good	Good

## SINGLE CRYSTAL SILICON EPITAXIAL BASE

### Product performance and application prospects.

Silicon carbide (SiC) coated base is the best base for single crystal silicon and GaN epitaxy, which is the core component of the epitaxy furnace. The base is a key production accessory for monocrystalline silicon for large integrated circuits. It has high purity, high temperature resistance, corrosion resistance, good air tightness and other excellent material characteristics.

### Product application and use

Graphite base coating for single crystal silicon epitaxial growth Suitable for Aixtron machines, etc  
Coating thickness: 90~150um  
The diameter of the wafer crater is 55mm.



## PLASMA ETCHING DISC

### Product performance and application prospects

At present, plasma dry etching is widely used in semiconductor etching, which USES plasma for thin film micro-machining. The dry etching process is a combination of chemical reaction and physical bombardment. Compared with the traditional wet etching technology, dry etching technology has been widely used in the field of microelectronics manufacturing due to its good anisotropy and process controllability, and is now gradually expanded to LED and other fields.

### Product features

- high strength (mohs hardness 9.5, second only to diamond)
- corrosion resistance to acid and alkali salts and organic solvents
- high thermal conductivity, plasma resistance, long life
- semiconductor



### Application domain link information

ICP/PSS etch process plate

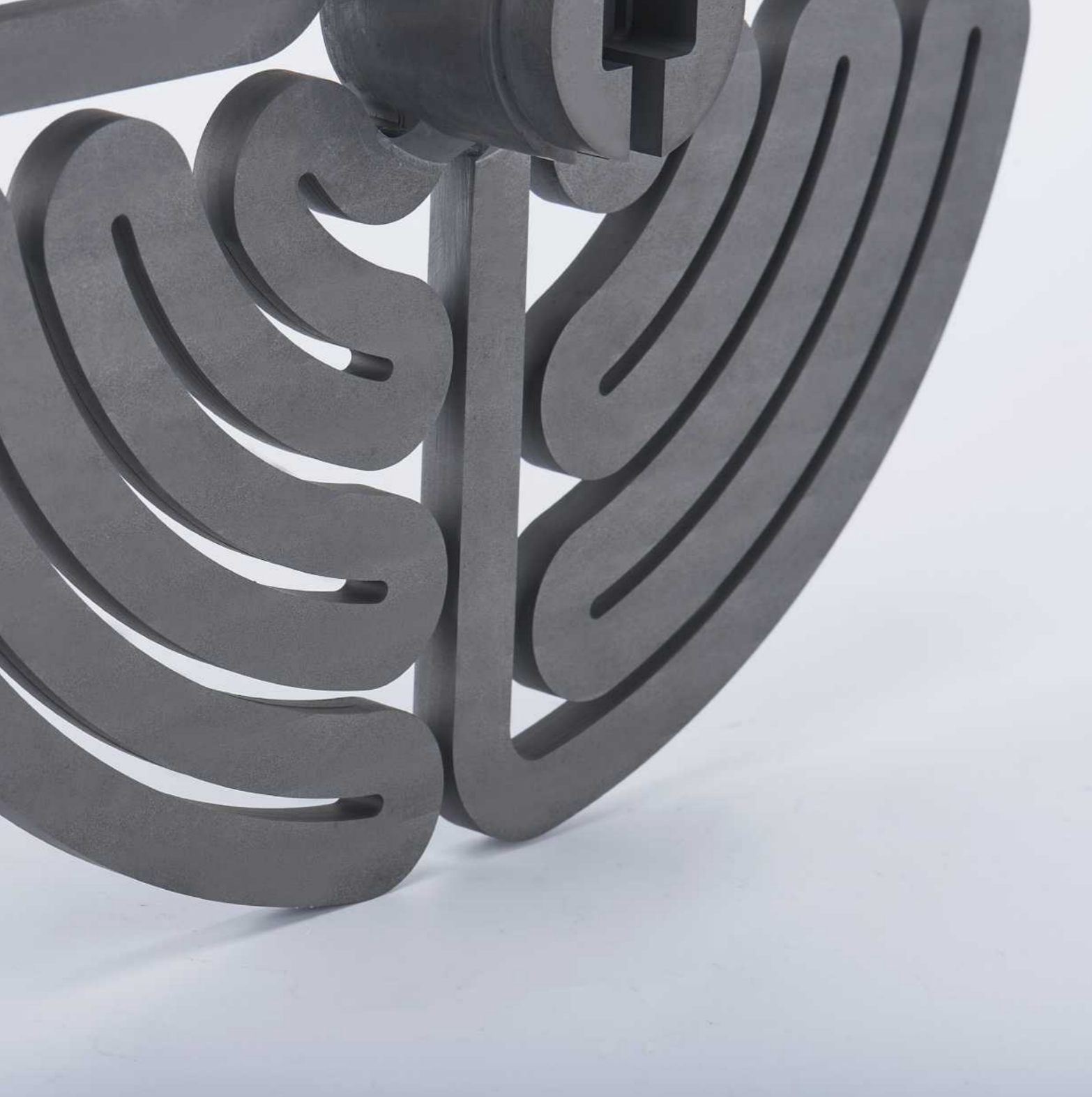
### Features

Silicon carbide materials have excellent thermal conductivity, high hardness, high temperature chemical stability, low coefficient of thermal expansion, and resistance to plasma bombardment, It has incomparable advantages in high temperature semiconductor components.

### Types

- 1.For Oxford/Ulvac/Samco/NMC equipment, 2/4/6.
- 2.Repairable, achieving cost down benefit.
- 3.Customized design.





## SOLAR PHOTOVOLTAIC

### Application

Guide tube and graphite crucible coating for single crystal silicon by straight-pull method

single crystal silicon industrial production by straight-pull method, three-petaled crucible as high temperature bearing and uniform heat conduction parts, flow tube as exhaust gas circulation channel



Solar deflector



Three disc pot



## HEATER, GRAPHITE PLATE, GRAPHITE CYLINDER, GRAPHITE SHEET AND OTHER SHAPED PARTS

### Product features

High temperature resistance, corrosion resistance, long service life, can improve the quality and output of the wafer. With very low coefficient of thermal expansion, high temperature resistance, high wear resistance, good insulation, good chemical stability, near purple (red) outside visible light penetration.

