AGC ELECTRONICS AMERICA

Roiceram-HS™: Ultra High Purity Silicon Carbide

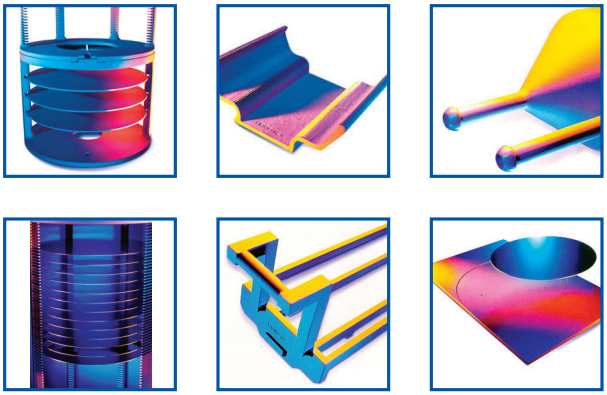
Roiceram-HS™ Silicon Carbide Materials

AGC, Asahi Glass Company, offers a full line of high-purity recrystallized & CVD-Coated silicon carbide furnace components marketed under the trade name Roiceram-HS™. Our SiC materials are preferred by wafer fabs and furnace manufacturers worldwide where processes demand the highest purity combined with dimensional precision and an overall lower cost of ownership.

At AGC, we're committed to process improvement. Our focus on "technical solutions" means that not only can we provide the highest quality materials for your most demanding applications, but we also understand the impact of cost, lead-time, performance, maintainability, and durability of our product.

Formed by slip casting, Roiceram-HS materials have a higher degree of flexibility to overcome the many diverse system configurations. Thin and uniform wall thickness for tubes and cantilevers provide for lightweight product design. This reduction in materials volume results in a lower heat mass permitting more accurate furnace temperature control.

Production of Roiceram-HS is highly controlled throughout the manufacturing cycle; from material granularity, to forming, sintering, machining, cleaning, and multiple levels of inspection. Although silicon carbide is a difficult material to machine, advanced techniques have been employed to meet your strictest requirements for dimensional precision.



Roiceram-HS Purity Table

As Table 1 shows below, our CVD-Coated SiC only allows for insignificant levels of trace materials creating highly pure, solid and uniform components.

(PPM by weight)

	SiC + Si Substrate	SiC-CVD Coating	Quartz
Analysis Method	**ICP**	**GDMS**	**ICP**
Al	12.9	0.09	0.8
Ca	3.9	<0.03*	0.5
Cr	<0.6*	<0.04*	NA
Cu	<0.4*	<0.008*	0.01
Fe	3.8	0.013	0.4
K	<0.2*	<0.02*	0.1
Mg	<0.2*	NA	0.1
Mn	<0.2*	NA	NA
Na	<0.6*	0.01	0.1
Ni	0.7	<0.006*	NA
Ti	1	NA	0.5
V	1	NA	NA
Zn	<0.4*	NA	NA

Notes: Typical data. Based on in-house & outside laboratory analysis. *Indeterminite/below threshold level.

Table 1.

AGC Electronics America, Inc. • 4375 NW 235 Avenue • Hillsboro, OR 97124 USA
503.844.3610 phone • 503.844.7207 fax • www.agcem.com

AGC

AGC ELECTRONICS AMERICA

Roiceram-HS™: Ultra High Purity Silicon Carbide

Material Strength in High Temperature Processes

When process temperatures climb to over 1000˚C, the wafer slots in a Roiceram-HS "boat" will easily maintain their initially machined tolerances, whereas a quartz boat will begin to soften and deform. Roiceram-HS boats will provide a much longer life in auto-wafer-transfer systems and increased up-time in your furnace. Table 2 shows a comparison of strength and softening point between SiC and Quartz.

	Unit	Quartz	SiC+CVD
Bending Strength	PSI	6200	33000
	MPa	42	230
	kgf/mm^2	4.3	23
Softening Point	˚C	1070	>1400

Table 2.

Chemical Etch Resistance

Silicon Carbide is chemically impervious to hydrochloric, hydrofluoric and nitric acids. Its chemical stability during cleaning provides an etch ratio over 1,000 times slower than quartz (Figure 2). The material surface conditions remain unchanged after acid cleaning processes whereas quartzware deteriorates rapidly. The impervious surface of Roiceram-HS prevents contamination and outgassing.

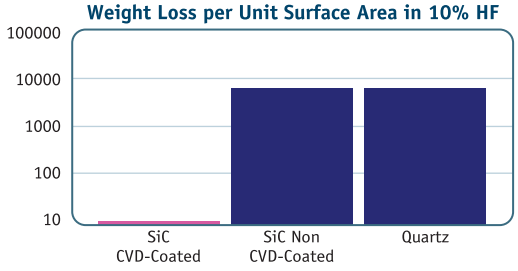


Figure 2.

Roiceram-HS in LPCVD Processes

One of the major causes of particle generation from furnace components in LPCVD processes is from the thermal expansion differences between the wafer carrier itself and the deposited film. The coefficient of thermal expansion (CTE) of SiC is highly similar to that of Poly Silicon and Silicon Nitride (Figure 1), so that the matter of cracking and particle generation normally associated with quartzware is significantly reduced. Unlike quartzware, SiC also overcomes particle count fluctuations observed over a period of time.

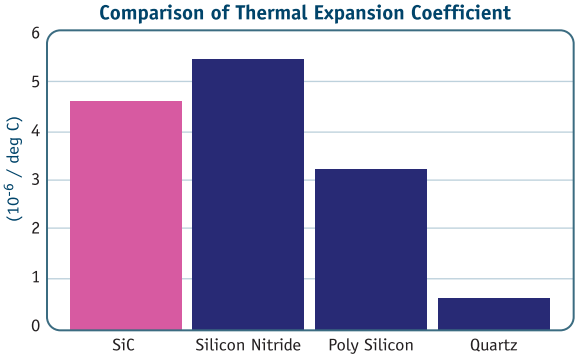


Figure 1.

AGC Electronics America, Inc.
4375 NW 235 Avenue, Hillsboro, OR 97124
503.844.3610 phone • 503.844.7207 fax
www.agcem.com