

SELECTED PROPERTIES OF SiC CERAMICS

The properties of SiC components may vary considerably depending on the respective production technology.

Pressure less sintered silicon carbide, SSiC, is the most suitable material for encapsulation of fuel and waste.

Property	[Unit]	RSiC ¹⁾	NSiC ²⁾	SiSiC ³⁾	LPSiC ⁴⁾
Open porosity	Vol.-%	10 - 16	10 - 16	0	0
4-point bending strength	MPa	80 - 120	120 - 200	200 - 400	500 - 600
Young's Modulus	GPa	220	200	350	380
Specific heat capacity at 30 – 1000 °C	Jkg ⁻¹ K ⁻¹	600 - 900	800 - 900	650 - 1300	600
Thermal conductivity	Wm ⁻¹ K ⁻¹	18 - 20	14 - 16	100 - 150	90
Max. temperature of use	°C	1600	1450	1380	1450
Thermal shock resistance	assessed	good	good	good	very good
Corrosion resistance	assessed	very good	good	poor at pH > 7	good

¹⁾ RSiC: Recrystallized

²⁾ NSiC: Nitride Bonded

³⁾ SiSiC: Silicon Infiltrated, also named as Reaction Bonded

⁴⁾ LPSiC: Liquid Phase Sintered

⁵⁾ SSiC: Solid State Sintered (pressure less with boron as sintering aid)

For fuel cladding a substitution of boron as sintering aid is required.