



SPACER & HEAT-SINK COMPOSITES

S-CMC (Super - Copper Molybdenum Clad)

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powered by

 **FJ Composite**

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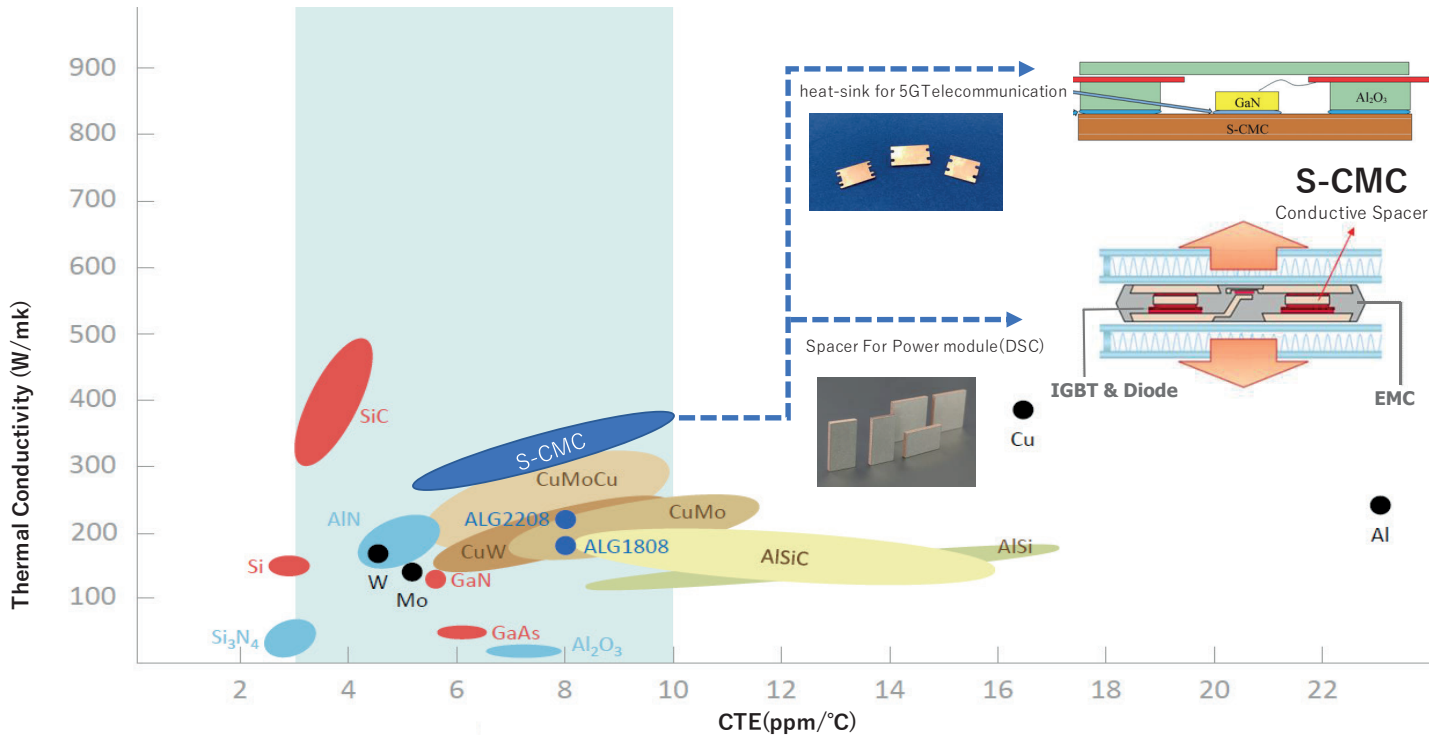
PHYSICAL PROPERTIES TABLE

Typical Properties		Super - CMC				Reference	
Mo Content (%)		Mo=5%	Mo=10%	Mo=20%	Mo=40%	Cu	Mo
Thermal Conductivity (W / mK)	Z-direction	362	335	291	230	394	137
	XY-direction	381	369	344	290		
Thermal Expansion (x 10 ⁻⁶ /°C)	RT - 250°C	14.8	11.8	7.4	6.6	17	5.2
	RT - 400°C	13.5	9.3	6.8	6.2	18	5.6
	RT - 800°C	9.5	7.5	6.5	6.1	19	5.7



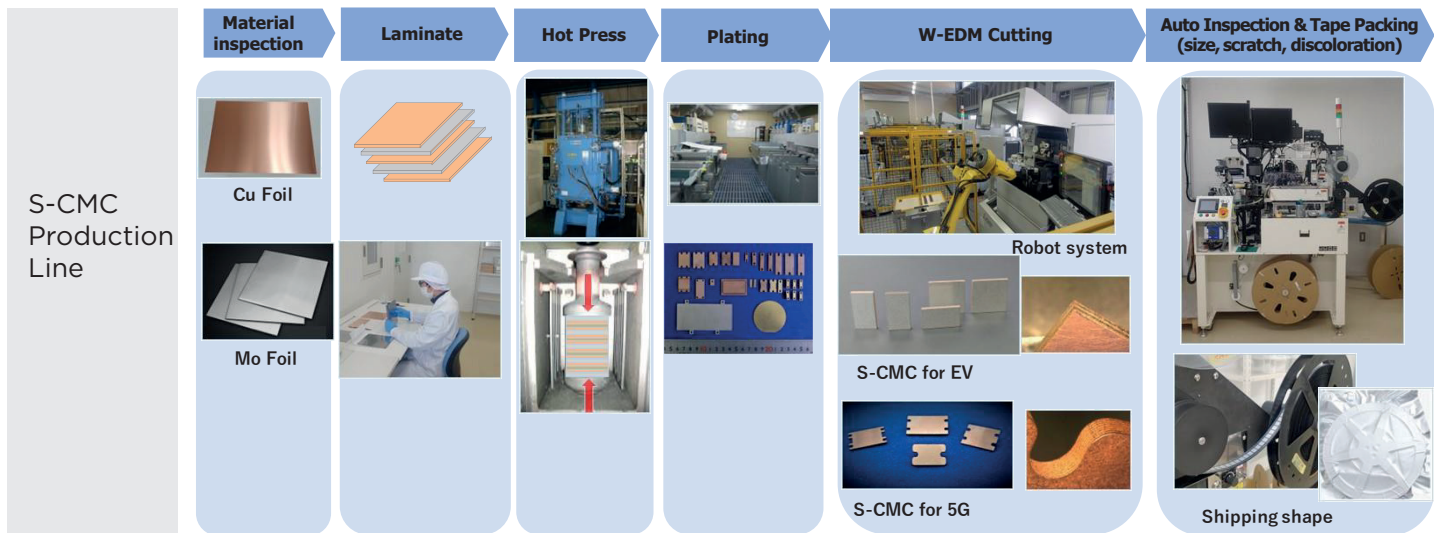
		S-CMC	Competitor (CPC)														
Process Description	Metalizing Method	<p>Diffusion Bonded Copper</p>															
Features	Cross section structure	<p>*Various layer structure available according to customer request</p>															
	Properties	<table border="1"> <thead> <tr> <th></th> <th></th> <th>S-CMC</th> <th>Competitor</th> </tr> </thead> <tbody> <tr> <td>C.T.E</td> <td>ppm/°C</td> <td>6~7</td> <td></td> </tr> <tr> <td rowspan="2">Thermal Conductivity</td> <td>Z-dir.</td> <td>291</td> <td>180</td> </tr> <tr> <td>XY-dir.</td> <td>344</td> <td>230</td> </tr> </tbody> </table>			S-CMC	Competitor	C.T.E	ppm/°C	6~7		Thermal Conductivity	Z-dir.	291	180	XY-dir.	344	230
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MATERIAL CHARACTERISTICS OF S-CMC AND OTHER MATERIALS



Our original „S-CMS® (Super CMC)“ is composed of multiple layers of Mo foil and Cu foil.
 Mo foil is effective more than Mo powder in order to control the CTE.
 As a result, S-CMC is high thermal conductivity because of less Mo using.

S-CMC PROCESS CHART



- Mo content (CTE) can be easily adjusted according to customer needs (low thermal expansion, high thermal conductivity)
- Diffusion bonding of various materials such as tungsten, diamond, AlN, aluminum, and carbon are possible.
- A wide variety of plating is possible. (Ni, Ag, Au, Au/Sn, Pt, etc)

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CONDUCTIVE SPACER DESIGN RULES

Spacer Spec				
Items			Unit	Value
Size			mm	1m~200mm
Dimension			mm	±0.05
Thickness			mm	±0.0075
Fillet			mm	≤ R0.1
Roughness			μm	≤ Ra 1
Burr	X,Y		mm	MAX 0.01
	Z		mm	MAX 0.01

Plating Spec				
Items			Unit	Value
				Electro Plating Non-Electro Plating
Specifications	1st (Ni)		μm	1~3
	2st (Ag)		μm	1~3
* Other plating is also available				

Properties			
Items			Value
CTE (DIL) *In case of Mo=20%	RT - 250°C		7.4 ppm/°C
	RT - 300°C		7.1 ppm/°C
Thermal conductivity *In case of Mo=20%	25°C		Z-dir. = 291W/mK
			X=Y-dir. = 344 W/mK
	100°C		Z-dir. = 290W/mK
			X=Y-dir. = 343 W/mK
Specific Heat [kJ/(kg•K)]	kJ/kgK		0.34
Specific Gravity			9.3
Hardness [Hv]	Hv		120
Transverse Rapture Strength	MPa		100
Tensile Strenght	MPa		120
Young's Moduls	Gpa		120
Poisson's Tatio			0.3
Electric Resistivity	Ωm		0.0003

