

Thin-Flat Submounts/Spacers for Semiconductor Thermal Management

Target Applications: High Power Laser Diodes and RF Circuits

Spectra-Mat has developed a high temperature sinter and infiltrate process for the manufacture of low expansion composite (LEC) materials. Our sinter and infiltrate process allows SMI's thin tungsten/copper submounts to achieve extremely flat surface conditions. We use only high purity raw materials. There are no lubricants or sintering aides added during processing. The result is a submount with excellent dimensional stability and thermal uniformity.

Spectra-Mat's Unique Process Offers the Following Advantages:

- Exceptional flatness and dimensional tolerance control
- Superior thermal conductivity compared to competitive products
- Excellent dimensional stability unaffected by high temperature cycling
- Ability to vary metal matrix density to achieve optimum combination of CTE and TC
- Metallization capability includes electrolytic, electroless, and thin film processes to meet your specifications

These characteristics make SMI's LEC material ideally suited where there is intimate contact between the semiconductor and a submount.



Typical Material Properties				
Compositions* (weight %)	90W/10Cu WC10	85W/15Cu WC15	80W/20Cu WC20	85Mo/15Cu MC15
Thermal Expansion (CTE) ($\times 10^{-6}/K$) 25°C - 400°C	6.2	6.8	7.4	6.9
Thermal Conductivity (TC) (W/m·K) @ 25°C	201	210	219	154
Density (g/cm ³)	17.2	16.6	16.2	10.0
EC (% IACS)	73.3 > 33%	73.6 >36%	73.8 >38%	>30%

Manufacturing Capabilities†		
Polished Surface Finish	Mirror	< 0.03 micron Ra
	Matte	0.4 - 0.5 micron Ra
Dimensional	Surface Flatness	10 micron / 10mm
	Thickness	125 micron to 25mm
	Max Dimension	250mm
	Edge Radius	< 15 micron
Metallization	Electroplated	Ni, Ni/Au, Ni/Cu, Cu, Ni/Ag
	Physical Vapor Deposition	Au, Ni, Pt, Ti, AuSn

†Best case for amenable designs

Typical properties are believed to be accurate and reliable, but are presented without guarantee or warranty.

For additional information, applications or pricing, please contact:

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