

Molybdenum-Copper Components

Custom Solutions

Many microelectronic applications require tailored thermal expansion and high thermal conductivity sub-mounts, bases, or packages. SMI, with over 45 years experience in composite materials manufacturing, provides innovative solutions to your critical packaging requirements.

SMI uses the same proprietary infiltration process as our tungsten-copper material, but substitutes high purity, fine grain molybdenum in place of tungsten. Molybdenum-copper offers a forty-percent density savings over tungsten-copper (W/Cu) for weight sensitive applications with only a minimum sacrifice in CTE.

Our proven press sinter and infiltrate process makes a molybdenum-copper (Mo/Cu) low expansion composite with excellent mechanical stability that is fully dense, guaranteeing hermeticity, homogenous thermal properties, superior platability, dimensional stability under thermal cycling, and high thermal conductivity.

SMI offers the design engineer the flexibility to custom tailor thermal expansion and still provide the highest available thermal conductivity with that CTE.

SMI composite Mo/Cu offers the following advantages to our customers:

- Tailored thermal expansion to meet your specific design criteria
- Highest thermal/electrical conductivity performance available for this material
- Outstanding thermal-mechanical stability
- Critical dimensional tolerance and surface finish control
- Metallization capability including electrolytic, electroless, and thin film processes to meet your specifications
- Finer particle size available for critical edge and thermal uniformity specification
- A forty percent weight savings compared to W/Cu

Target Applications: RF/Microwave, Flight/Space

Typical Material Properties			
Composition* (weight %)	Density (g/cc)	CTE ($\times 10^{-6}/K$) 25°C - 400°C ¹	TC (W/m•K) 25°C ²
MC15 85Mo/15Cu	10.0	6.9	154
MC20 80Mo/20Cu	9.9	7.5	164
MC25 75Mo/25Cu	9.8	8.0	174

Typical properties: 1) +/- 0.5 2) +/- 5%

SMI Mo/Cu components are used in the following applications and configurations:

- ◆ Airborne/Satellite radar and other RF communication systems
- ◆ Telecommunication: RF and optical
- ◆ Microelectronic hermetic packages, housings and bases
- ◆ Heat sinks and sub-mounts for RF and microwave (GaAs) circuits
- ◆ Carriers for high reliability ceramic substrates
- ◆ Critical glass-to-metal interfaces

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

For additional information, applications or pricing, please contact:

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