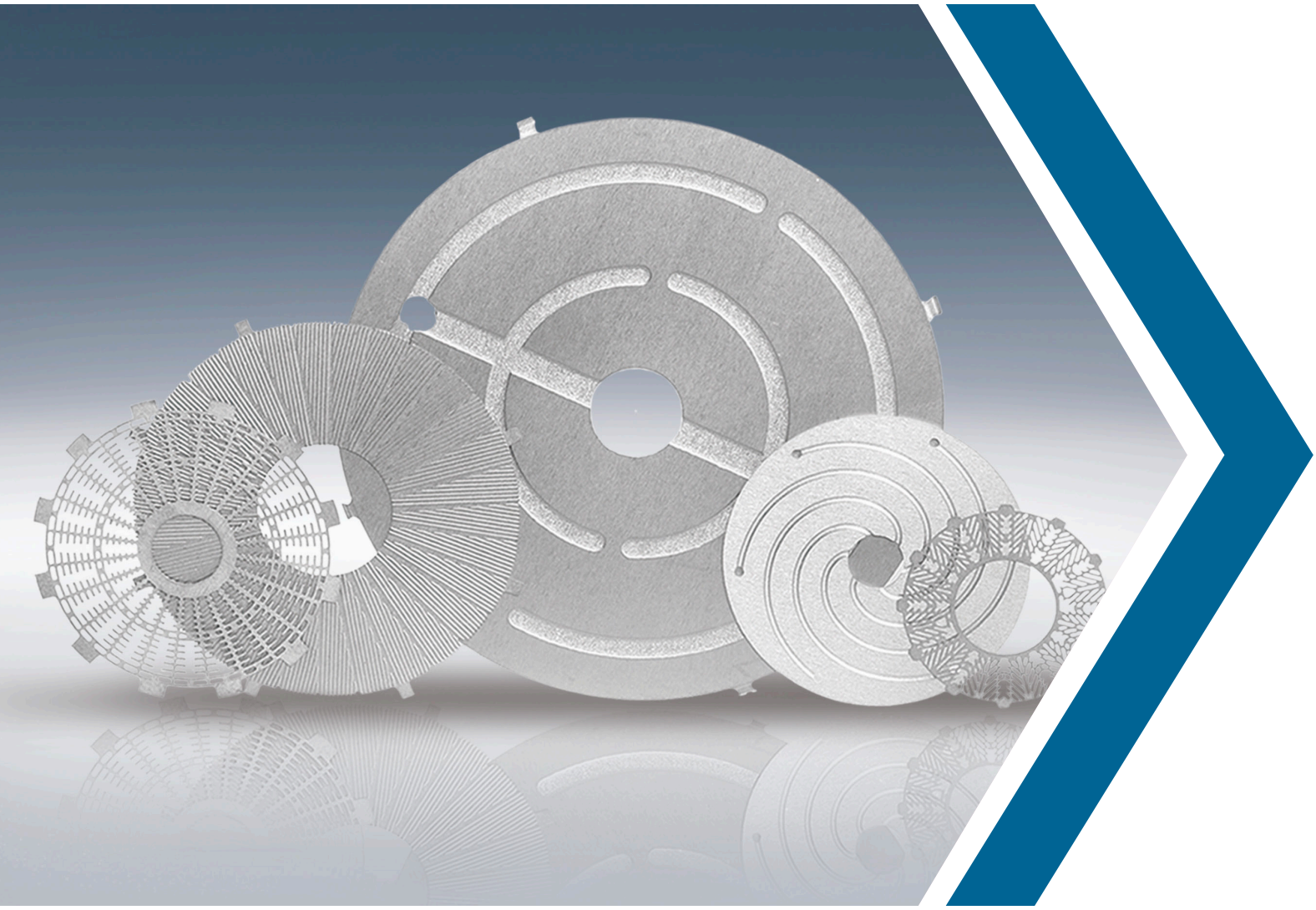
REFRACTORY METALS
for the Power Semiconductor Industry



ELMET
TECHNOLOGIES

HIGH TECH MATERIALS FOR THE POWER SEMICONDUCTOR INDUSTRY

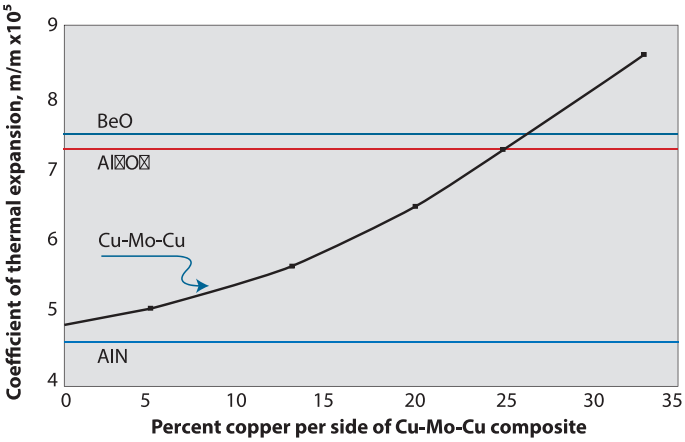
Elmet Technologies has decades of experience in the production of high performance materials that provide solutions to demanding applications in the electronics industry.

Custom-engineered thermal management materials from the Fabricated Products Group of Elmet Technologies are helping the electronics industry continue its rapid growth, part of which is driven by increasing miniaturization. This trend puts ever greater cooling demands on electronic circuitries. Our molybdenum and tungsten materials, laminates, and engineered composite materials are uniquely suited for these applications.

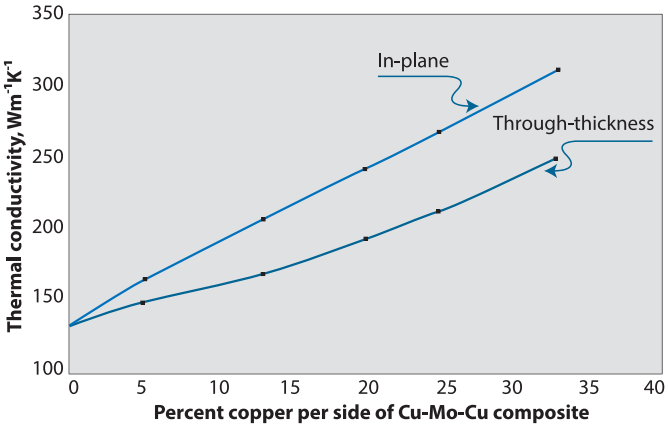
The thermal properties of our materials include their low and controlled CTE (coefficient of thermal expansion) and high TC (thermal conductivity), which help remove heat rapidly from high power density devices. Equally important is the expertise of our engineering staff in designing highly engineered materials that match the specific requirements of each application.

Our CuMoCu laminates have an adjustable CTE that could be matched to Si while maintaining high thermal conductivity, which makes them an ideal choice for power devices where considerable heat is generated.

CTE OF CU-MO-CU-LAMINATES



TC OF CU-MO-CU-LAMINATES



Exceptional Properties:

> Adjustable CTE and TC values

> Suitable for Si-based devices

> Low electrical and thermal resistance

> Moderate thermal conductivity (Mo = 140-150 W/mk)

> Suitable for large area power devices with considerable heat generation

VALUE-ADDED PRODUCT SOLUTIONS FOR POWER SEMICONDUCTORS

Advancements in electronic controls in high power equipment have resulted in specific demands of the packing materials. Molybdenum and metal-metal matrix composites manufactured by Elmet Technologies minimize stress in the package while allowing the electronics to operate in the manner desired.

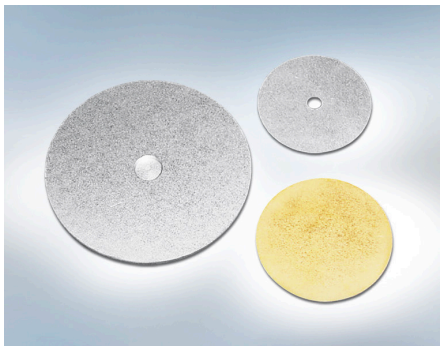
Molybdenum and tungsten flat parts are widely used as contact materials in:

> Silicon Controlled Rectifiers Diodes

> Transistors

> Thyristors (GTO 's)

> Heat Sink Bases in IC's, LSI's and Hybrid Circuits



Value-Added Product Solutions:

> Discs/Molybdenum

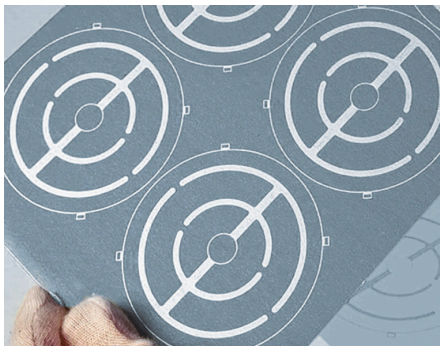
- Thickness: 0.1 mm – 6.0+ mm
- Diameter: 1.0 mm – 150.0 mm*

> Discs/Tungsten

- Thickness: 0.1 mm – 3.0 mm
- Diameter: 5.0 mm – 60.0 mm*

> Squares/Molybdenum and Tungsten

- Thickness: 0.01 mm – 3.0+ mm
- Width/Length: 0.50 mm – 200.0 mm*



* depending on thickness

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