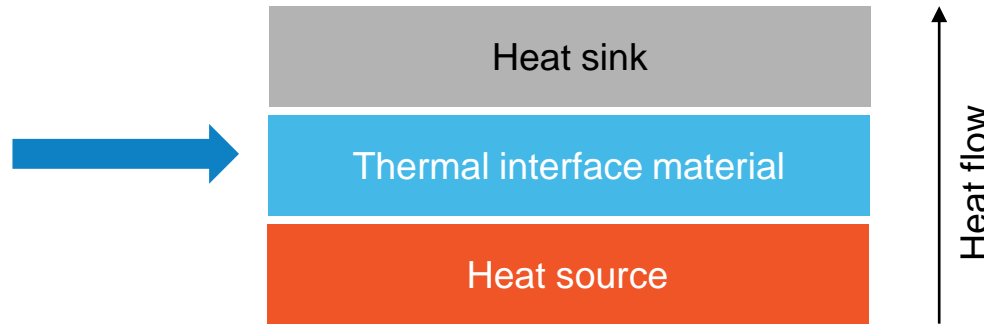


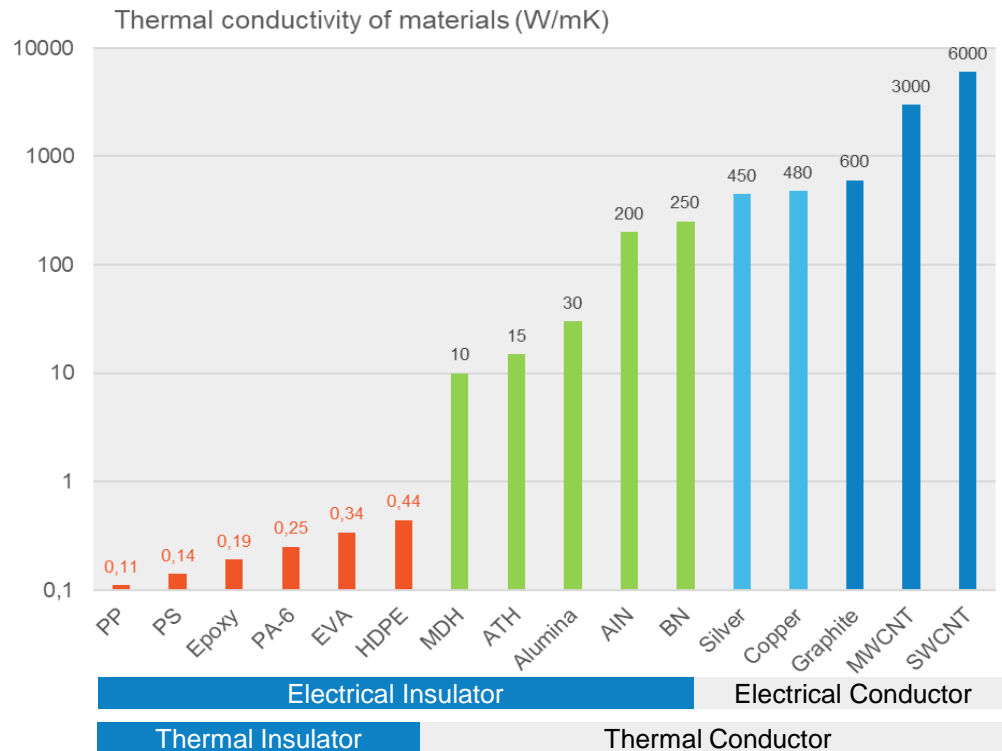
Thermal Interface Materials (TIM)

- Tapes
- Pads
- Gap fillers
- Grease
- Adhesives

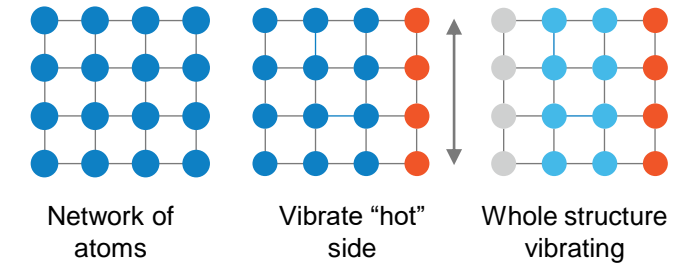


Thermal Coupling

- Minimize thermal resistance
- Enables heat dissipation

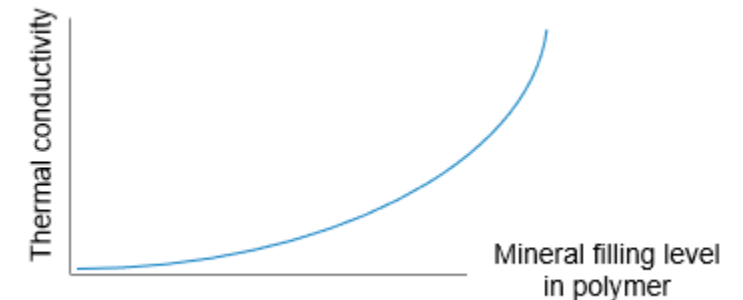


Heat Dissipation lattice vibration - phonons



Percolation effect

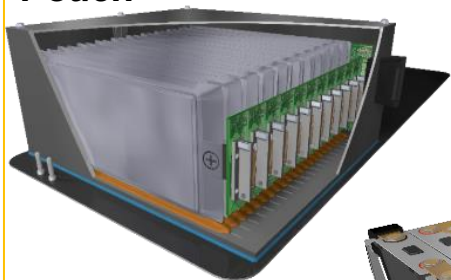
Efficient heat dissipation is achieved when particles start to percolate – direct particle-particle interaction



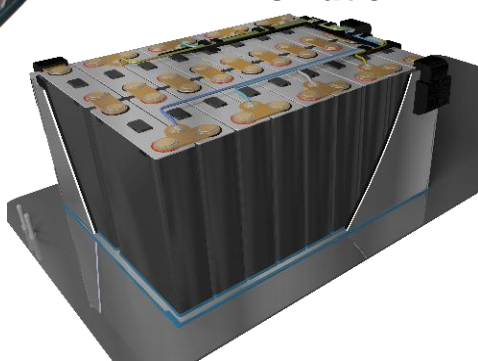
TC Materials Improve EV Range and Fast-Charge Ability

Battery Packs

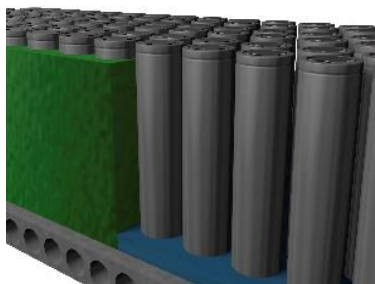
Pouch



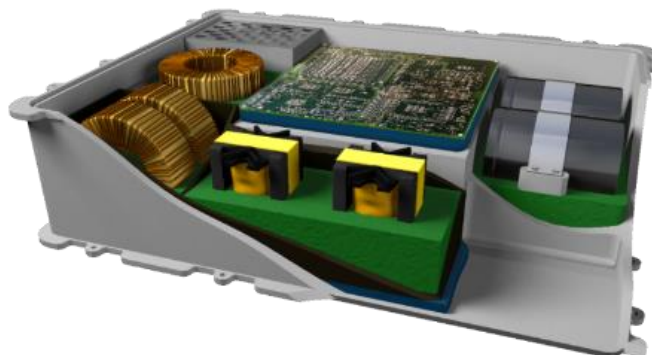
Prismatic



Cylindrical

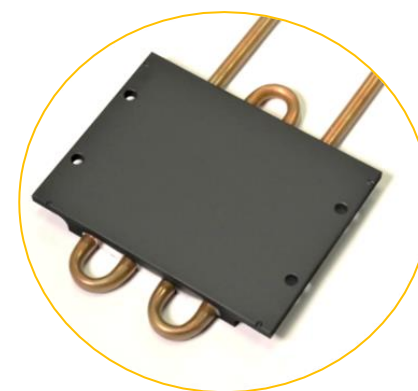


Power Electronics



- Gap Filler
- Potting/Encapsulation
- Structural Adhesive

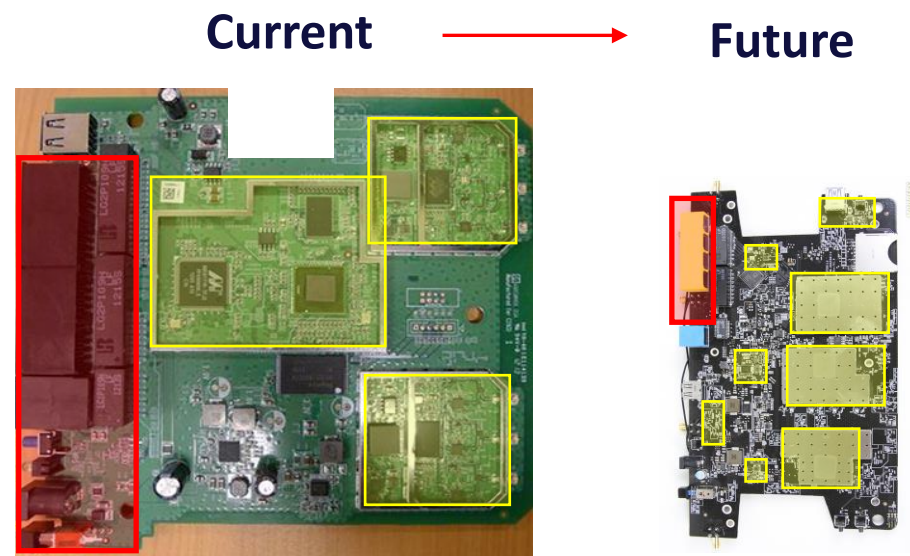
Dielectric Coating Applications





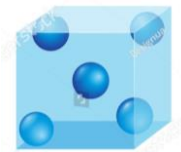
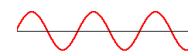
CoolTherm® 2K Silicones, Urethanes, Epoxies, and Acrylics




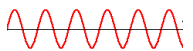


TIMs – Solve Increasing Thermal Challenges Across a Wide Range of Applications



 Power  Signal

			
Speed	Temp.	Density	Frequency

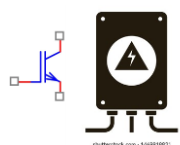
			
Speed	Temp.	Density	Frequency



- Consumer electronics - trends will continue to be miniaturization with increased functionality.



- High End Computing - increased power densities, larger area semiconductor packages.



- Power – Large bandgap semiconductors (SiC, GaN), increased operating temperature



- 5G - higher frequency operation



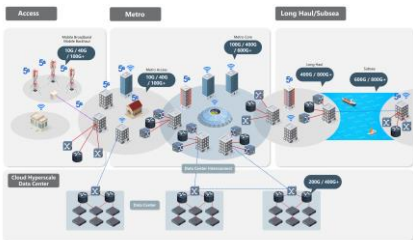
- Automotive - Electrification and electronification

Tflex™, Tputty™, Tpcm™, Coolzorb™ - Lower total thermal resistance, automated application

Thermal Management Solutions Across Markets



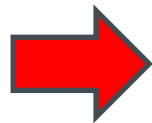
Automotive Electrification



Communication and IoT



Power Conversion & Industry 4.0



Automation for HVM

Harsh Environment
Reliability

Power
Density/Miniaturization

High temperature
electronics materials



Bergquist™ Gap Filler



Bergquist™ Gap Pad



Loctite™ Adhesives



Bergquist™ SilPad Insulators



Loctite/ Bergquist™ Phase
Change



Bergquist™ Greases/Gels