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Variable Conductivity Plate

A variable conductivity material allows for precise external mechanical control of thermal resistance, making it ideal for managing temperature fluxes in structures like engines and satellites.

Thermal conductivity is a relevant material property. Common materials possess thermal conductivity intrinsically dependent on temperature.

Purdue University researchers have developed a material that is capable of changing its thermal conductivity with an external control; thus, it can exhibit thermal-resistant changes independent of temperature. The topological interlocking of unit polyhedral creates the proposed variable conductivity material (VCM). Since the unit elements interact by contact only and conductivity is highly dependent on contact conditions, the material's thermal conductivity can be controlled by external mechanical forces.

This material would be extremely useful in thermally active structures and structures that experience fluxes in temperature such as engines or satellites. A material with variable conductivity would act as a thermal fuse or valve to allow an influx or outflux of energy as needed.

Advantages:

-Allows for external control of the material's thermal conductivity

Potential Applications:

-Materials

-Manufacturing

TRL: 3

Intellectual Property:

Technology ID

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Category

Aerospace & Defense/Thermal Management & Combustion Optimization

Materials Science & Nanotechnology/Thermal Management Materials & Solutions

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