High Emissivity Coatings for Hypersonic Vehicles

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- Mechanical Engineering

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Hypersonic vehicles, including missiles and manned aircraft, require sharp featured nose tips and wing leading edges to reduce drag on the vehicle. However, the geometry of these edges increases the convective heat flow to the surface, ultimately increasing the overall temperature of the component to temperatures as high as 2300 K. These extremely high temperatures can lead to an increased chance of structural failure during operation and require the use of exotic materials for construction.

Researchers at Purdue University have developed an approach to reduce the heat flow to these critical components through the use of high emissivity coatings. These high emissivity coatings will be applied on top of the conventional structure and will reradiate heat back to the environment, limiting the amount of heat absorbed by the underlying ceramic structure. By reducing the heat absorbed by critical components, performance of existing high temperature structures can be greatly improved.

Advantages:
-Decreased heat flow from hypersonic leading edges and nose cone components
-Decreased operating temperatures

Potential Applications:
-Materials
-Manufacturing

People:
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Intellectual Property:

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