METHODS TO MAKE ALUMINUM ALLOY COATING ULTRA-STRONG AND HIGHLY THERMALLY STABLE

A novel ultra-strong aluminum alloy offers superior thermal stability, significantly raising operational temperature limits and yield strength for aerospace and automotive applications.

Aluminum alloys are used in a variety of engineering applications including aerospace, automotive and others due to their workability, light weight, low cost and resistance to corrosion. However, applications are often hindered by the low strength and drastic softening that aluminum alloys experience at high temperatures. Nanocrystalline aluminum alloys improve strength, but possess poor thermal and mechanical stabilities at elevated temperatures.

Researchers at Purdue University have developed an ultra-strong aluminum alloy with superior thermal stability at high temperatures. This alloy demonstrates superb microstructural and mechanical stabilities up to 400ËšC, 72 percent of aluminum's melting temperature. Conventional aluminum alloys have yield strength values limited to around 700 MPa and operation temperatures around 130 ËšC. This development uses a unique recipe to yield strength of roughly 2 GPa and operation temperatures over 300 ËšC.

Advantages:

-Strength

-Thermal stability at high temperatures

Potential Applications:

-Aerospace

-Automotive

TRL: 4

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Authors
Qiang Li
Nicholas Richter
Haiyan Wang
Sichuang Xue
Xinghang Zhang
Yifan Zhang

Further information
Parag Vasekar
psvasekar@prf.org

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