

Ultra-strong Aluminum Alloy Formulation with Superior Thermal Stability at High Temperatures

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- Materials and Manufacturing

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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 400- $\times 10^3$ s⁻¹. Conventional aluminum alloys have yield strength values limited to around 700 MPa and operation temperatures around 130- $\times 10^3$ K. This development uses a unique recipe to yield strength of roughly 2 GPa and operation temperatures over 300- $\times 10^3$ K.

Advantages:

- Strength
- Thermal stability at high temperatures

Potential Applications:

- Aerospace
- Automotive

People:

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