



Superior Nanocomposite Welding Wire

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WARF: P130003US01

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a method to improve weld quality with new welding wires made of metal alloys and dispersed high-temperature nanoparticles.

Overview

Advanced metal alloys with high strength and fracture toughness are used in an increasing number of applications. However, some metal alloys like Al-Cu have been underutilized due to poor weldability. The extent of 'hot cracking' that can occur during cooling is one measure of weld quality. Attempts to reduce the susceptibility of a material to hot cracking and therefore improve weldability have been unsatisfactory.

The Invention

UW-Madison researchers have developed methods to fabricate welding wires exhibiting significantly reduced hot cracking defects.

The wires can be made from a range of metal alloys, including aluminum, steel and titanium-based alloys. Nanoparticles composed of high-temperature inorganic materials, such as intermetallic compounds or ceramics, are dispersed into the alloy. The composite material is extruded in a single stage to form wire.

Applications

- Wire for welds and repairs
- Use with 7xxx and 2xxx series alloys in aerospace and military vehicles
- Alloys that have high hot tearing tendency during solidification

Key Benefits

- Reduced hot cracking defects
- Grain refinement and modification
- Wires can be made from underused metal alloys.
- Avoids impurities
- No need for heat treatment or filler metals

Additional Information

Related Technologies

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Tech Fields

- [Materials & Chemicals : Composites](#)

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