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CoFe-Al₂O₃ Soft Magnetic Composite

Tech ID: 33443 / UC Case 2023-718-0

BRIEF DESCRIPTION

CoFe-Al₂O₃ is a soft magnetic composite that can be formed using net shape manufacturing and offering superior magnetic, electrical and thermal properties.

SUGGESTED USES

- High power electrical motors
- Transformer and inductor cores

FEATURES/BENEFITS

- Net shape manufacturing
- High saturation magnetic polarization
- High permeability/Low coercivity
- High electrical resistivity/low eddy current losses
- Potential for large scale production
- Operational at higher temperatures compared to composites with polymer matrices

TECHNOLOGY DESCRIPTION

Soft magnetic materials are used as the magnetic cores of a wide variety of power conversion devices such as electric motors, transformers, and inductors. The electrical requirements of these cores include high permeability/low coercivity, high saturation magnetic polarization, and high electrical resistivity. The soft magnetic composite developed in this work can be used to achieve more efficient transformer cores and electrical machines compared to state of the art materials such as Si Steels and CoFe alloys. It features a unique Al₂O₃ coating on CoFe particles that serves as an electrically insulative barrier. The composite is consolidated using spark plasma sintering, enabling the net-shape fabrication of the composite for large-scale magnetic core manufacturing.

STATE OF DEVELOPMENT

Technology validated in lab

PATENT STATUS

Patent Pending

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INVENTORS

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OTHER INFORMATION

CATEGORIZED AS

- » **Materials & Chemicals**
- » Composites
- » **Engineering**
- » Other

RELATED CASES

2023-718-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

▶ Additive Manufacturing (3-D Printing) Of Standardized 5xxx Series Aluminum

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