

## Available for Licensing

### Tunable Nanocomposite Alloys for Magnetic Field Sensing

#### Opportunity

Research is currently active on the patent pending technology titled, "Tunable Anisotropy of Co-Based Nanocomposites for Magnetic Field Sensing and Inductor Applications." This technology is available for licensing and/or further collaborative research from the U.S. Department of Energy's National Energy Technology Laboratory.

#### Overview

Nanocomposite materials comprised of metallic crystals embedded within an amorphous matrix have been demonstrated to have soft metallic properties (i.e., easily magnetized or demagnetized), which are applicable to a wide range of applications including sensors and inductive devices. There is a growing need to develop improved soft magnetic materials for advanced electronic and power system applications that operate under high temperatures, frequencies, and power levels.

This invention describes the design, production, and use of Co-rich soft magnetic nanocomposite materials with tunable anisotropies. Compared to conventional process and materials, nanocomposite alloys developed using this method demonstrate enhanced properties including improved thermal stability and mechanical properties. Nanocomposite magnetic materials derived using this process will have utility in high temperature applications including power electronic cores and for sensing elements in magnetic field sensors.

#### Significance

- Method allows for material optimization through tunable magnetic permeabilities, providing for broader process applications.
- Nanocomposite magnetic alloys have improved thermal stability and mechanical properties.
- Materials display enhanced properties for operation at high frequencies.

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#### Contact

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## Applications

- High temperature magnetic field sensors.
- High temperature inductors, inverters, and transformers.
- Gapless inductor cores to substitute for powder inductor cores.

## Related Patents

U.S. Nonprovisional Patent No. **14/278,836** filed September 20, 2014, titled "Tunable Anisotropy of Co-Based Nanocomposites for Magnetic Field Sensing and Inductor Applications. Inventors: Alex M. Leary, Paul R. Ohodnicki, Michael E. McHenry, Vladimir Keylin, Joseph Huth, and Samuel J. Kernion

This invention is jointly owned by NETL and Carnegie Mellon University. NETL is looking to license its rights in the invention.



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