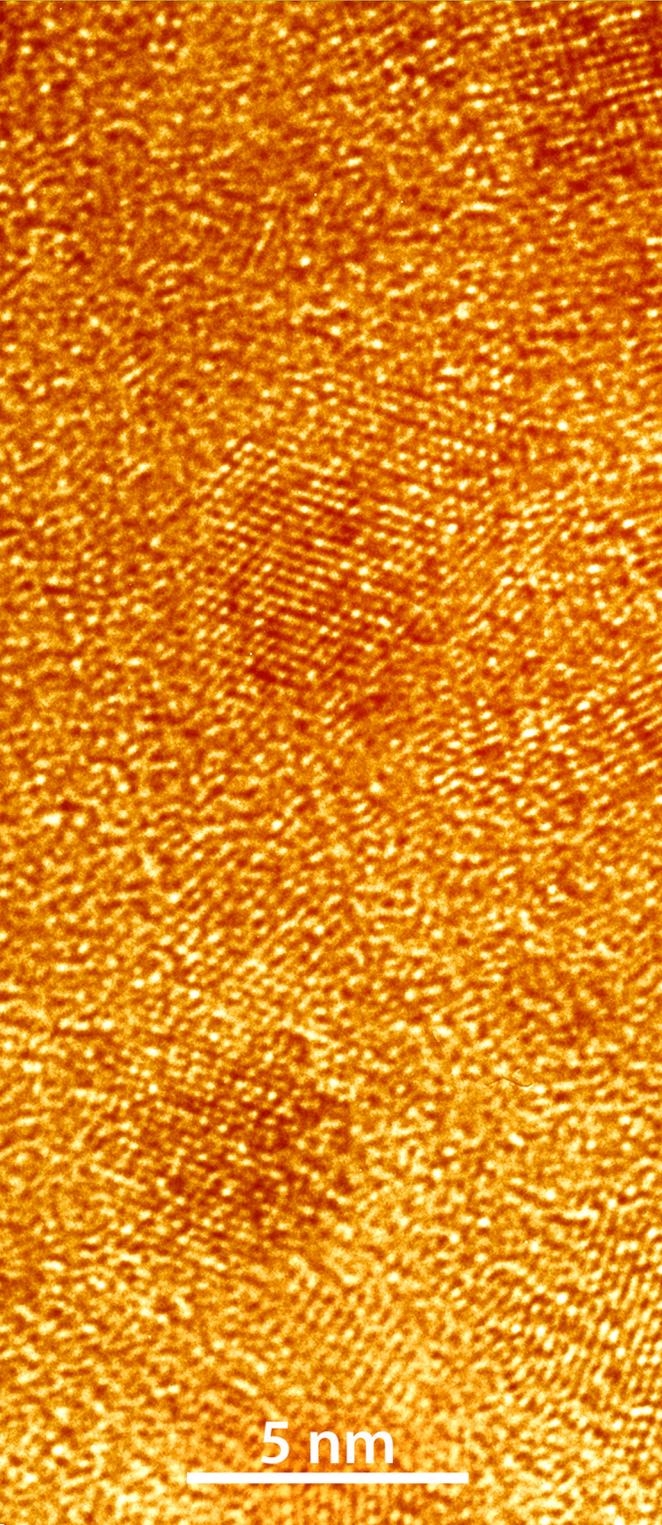


# Available for Licensing



## TUNABLE NANOCOMPOSITE ALLOYS FOR MAGNETIC FIELD SENSING



### OPPORTUNITY:

Research is currently active on the 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.

(continued)

## 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. Patent No: 10,168,392

Issued: 01/01/2019

Title: Tunable Anisotropy of CO-Based Nanocomposites for Magnetic Field Sensing and Inductor Applications

Inventors: Alex Leary, Paul Ohodnicki, Michael McHenry, Vladimir Keylin, Joseph Huth, Samuel Kernion

NETL Reference No: 13N-33

U.S. Patent Pending (non-provisional patent application)

Filed: 07/08/2016

Title: Tunable Anisotropy of Co-Based Nanocomposites for Magnetic Field Sensing and Inductor Applications

Inventors: Alex Leary, Paul Ohodnicki, Michael McHenry, Vladimir Keylin

NETL Reference No: 13N-23

These inventions are jointly owned by NETL and Carnegie Mellon University. NETL is looking to license its rights in these inventions.



1450 Queen Avenue SW  
Albany, OR 97321-2198  
541-967-5892

3610 Collins Ferry Road  
P.O. Box 880  
Morgantown, WV 26507-0880  
304-285-4764

626 Cochran Mill Road  
P.O. Box 10940  
Pittsburgh, PA 15236-0940  
412-386-4687

Visit the NETL website at:  
[www.netl.doe.gov](http://www.netl.doe.gov)

Customer Service:  
**1-800-553-7681**

