



# Specialty Materials

## SPECIALTY MATERIALS

### SUPERCONDUCTIVE POWDERS

### OTHER NANOMATERIALS

Fuel Cells

Batteries

Thermoelectric

Photovoltaic

Membranes

Porous Ceramics

Engineered Nanoparticles

Lower Melting Solder

Nanostructured Coatings

Nanocement (patented)

MetaMateria has a strong history in the creation and use of advanced materials that can benefit the lives of others through cleaner air and water. A key capability is the use of game-changing nanomaterials having reactive surfaces that make them particularly effective for environmental and other applications. Preparing materials that maintain their reactivity is especially important and is a key toward utilizing these for water cleanup.

Nanomaterials can also be used to improve performance in almost all applications and MetaMateria has experience in making and using these for batteries, fuel cells, thermoelectric devices, photovoltaics, electronics, coatings, gas and water membranes and even nanocement, which can double strength of concrete mixes. While commercial opportunities do exist, MetaMateria is very selective and only pursues opportunities where established markets exist.

---

High Energy Physics applications supported by the Dept. of Energy (DOE) and the International community require increasing performance of superconductors used for medical and physics applications. This requires with higher quality starting materials. Because of our expertise, DOE provided funding to prepare higher quality BI-2212 powder, used to prepare superconductor wires at Oxford Superconductor (subcontractor) for magnets that generate very high magnetic fields (>15T).

The only commercial source of BI-2212 powder is a German company and a U.S. supplier is desired. Powder prepared by MetaMateria has shown that it meets desired performance requirements and this has created high interest by DOE contractors. The market for MRI equipment for very high is about \$1.6B, but less than \$0.4B for ultra high fields. Growth depends upon major installations, such as a supercollider (CERN) upgrade. Currently, the annual market for BI-2212 is only \$300K but is expected to grow to \$500K/year; however, margins are very high and will be a profitable market. If BI-2212 is used in a new collider project, some 100 metric tons will be needed, which could represent over \$100 M. DOE will sustain suppliers until the market grows sufficiently. While investment capital will be needed for expanded production, equipment to meet near term needs was built with DOE funds.

In addition to environmental applications, other nanomaterials applications do exist but are not being actively pursued unless a meaningful market or customer develops. Any development work and needed equipment will be supported by funding from other sources. Because of past efforts, capabilities to prepare trial amounts of various nanomaterials are available.

---

MetaMateria desires business relationships with organizations aligned to our interests in commercialization of its environmental technologies and products. These may take the form of integrating MetaMateria products into new systems or existing product lines. It may also result in a joint venture to integrate existing capabilities to address specific market needs or it may be an equity investment in MetaMateria, which is now being pursued to accelerate business development in targeted markets. MetaMateria also expects future licensing arrangements to accelerate commercial use of MetaMateria products, especially internationally.