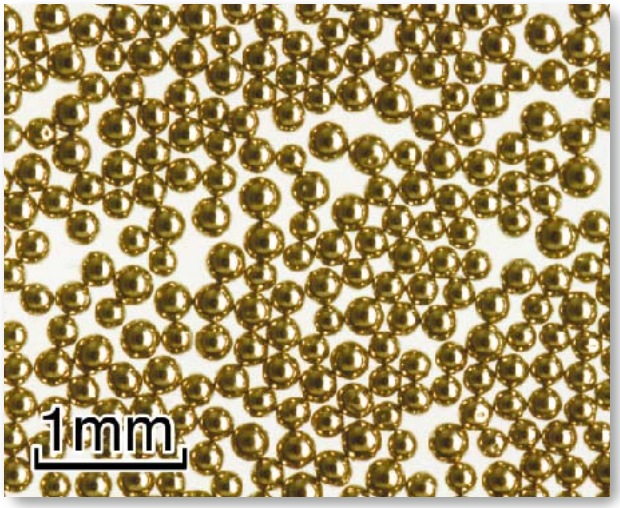
Magnetic Materials for Cryogenic Regenerator Matrices

Magnetic Regenerator Material -guide Material to the Ultra-low-temperature World

Magnetic regenerator material is a rare-earth metallic compound, and has large specific heat in the region of ultra-low temperature. Conventionally, lead was used for this purpose with insufficient performance because the specific heat of lead drops abruptly in the working region. Our material maintains sufficient specific heat under 4 K without liquid helium.

Application example: Magnetic Resonance Imaging (MRI) system
Photo: Cordially by Toshiba Medical Systems Corporation



[Advantages]

- Our material is an environmentally friendly product because it is a substitute for lead.
- Our material has a large change in specific heat that is produced by magnetic phase transformation under 15 K.
- Our material is spherical-shaped powder, whose diameter is 100 to 300 μm on average, which reduces loss in gas pressure.
- Our spherical-shaped powder material is free from deformation or disintegration even after a long period of service.

[Applications]

Ultra-low-temperature Refrigerator for Superconductivity Devices

- Gifford McMahon (GM) refrigerator
- Pulse-tube refrigerator

Example of Superconductive Facilities

- MRI
- Magnetically suspended vehicle
- Cryopumps
- Superconductive filters for communication facilities