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PLASTIC SUPERCONDUCTOR BEARINGS
ANY SIZE - ANY SHAPE
77 k AND UP

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ABSTRACT

"Friction free" bearings at 77 k or higher are possible using the high Tc copper oxide ceramic superconductors. (1), (2)

The conventional method for making such bearings is to use a sintered ceramic monolith. This puts great restraints on size, shape and post-forming machining. The material is hard and abrasive.

It's possible to grind up ceramic superconductors and suspend the granules in a suitable matrix. Mechanical properties improve and are largely dependent on the binder. The Meissner effect is confined to individual grains containing electron vortices. (3)

Tracks, rails, levitation areas and bearings can be made this way with conventional plastic molding and extruding machines or by painting. The parts are easily machined. The sacrifice is in bulk electrical conductivity.

A percolating wick feel for LN2 can be used to cool remote superconductors and large areas quite effectively. A hollow spheroid or cylinder of superconductor material can be molded with the internal surfaces shielded by the Meissner effect. It might be thought of as the DC magnetic analogue of the Faraday cage and the inside can be called the Meissner space."

It's selective. AC fields are transmitted with minor attenuation. Particle size and distribution have a profound effect on final magnetic and electrical characteristics.

(1) Muller, K.A. and J.G. Bednorz, "The Discovery of a Class of High-Temperature Superconductors," Science, Article 1133, September 4, 1987.

(2) Hor, P.H., R.L. Meng, L. Gao, Y.Q. Huang, and C.W. Chu, "Superconductivity at 93k in a New Mixed-phase Y-Ba-Cu-O Compound System at Ambient Pressure," Physical Review Letters, Vol. 58, No. 9, March 2, 1987, p. 908.

(3) Saint-James D., G. Sarma, and E.J. Thomas, Type II Superconductivity, Pergamon Press, 1969, p. 279.