



MSEN 681 Seminar Series

4:10 PM, Monday, September 22, 2014 • 104 Jack E. Brown

Development of Bi-2212 Wires for High-Field Magnetic Applications

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The talk will begin with a general overview of superconductivity and practical superconductors. It will shift to Bi-2212 ($\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_x$).

Bi-2212 is the only cuprate-based high-temperature superconductor (HTS) that can be made as a round wire, which is of interest to magnet designers and builders. These round wires can be made with a multifilament architecture, can be twisted, and can be easily cabled (Rutherford and 6-on-1 cables), which are important attributes for building high-field magnets ($> 30 \text{ T}$).

abstract

Even though the first round-wire Bi-2212 were made in 1989, until recently, Bi-2212 wires did not have high enough J_c for practical applications. The problem was bubbles that form in the wire during processing that block current. In this talk I will describe the development of overpressure (OP) processing, which is a form of hot isostatic pressing (HIP), that removes the bubbles and yields high J_c . Now that we have identified and can remove the main current limiting mechanism, we are reinvestigating all aspects of the heat treatment of Bi-2212 to understand how each portion of the heat treatment affects the final electromagnetic properties of Bi-2212.

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