

High Performance Iron-based Superconducting Wires: Fabrication and Properties

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Abstract—The high upper critical field and low anisotropy of iron-based superconductors (IBS) make them being particularly attractive for high-field applications, especially for the construction of next-generation nuclear magnetic resonance (NMR) spectrometers, particle accelerators and ultra-high-field magnets. Conventional powder-in-tube (PIT) method has been the most effective technique for fabricating IBS wires and tapes. The transport critical current density J_c of IBS wires and tapes has been rapidly increased in the recent years. A record high J_c of above 2×10^5 A/cm² is obtained at 4.2 K and 10 T and remains above 10^5 A/cm² up to 27 T, suggesting competitive advantages at high fields. In this presentation, I will report recent activities of the wire processing based on 122 IBS materials. Finally, the future development and problems to be solved in this area are suggested.

Keywords (Index Terms)—Iron-based superconductors, wires and tapes, J_c , long wires, coils