CRITICAL CURRENTS OF FeAs BASED SUPERCONDUCTORS IN HIGH MAGNETIC FIELDS: HOPES FOR LARGE SCALE APPLICATIONS

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In addition to presenting intriguing physics, the FeAs based superconductors revive our hopes for large scale applications due to their high upper critical fields and relatively low anisotropy. An important question arises if the pinning properties of these compounds are sufficient to provide high critical currents at high magnetic fields. We will focus on the critical currents, the upper critical field, and their anisotropy in low (∼15 T) and high (up to ∼65 T) magnetic fields. The critical current densities $j_c \approx 10^6$ A/cm^2 have been measured both magnetically and by transport for the SmFeAs(O,F) single crystals in the *ab*-plane at temperatures $T \simeq 5$ K and magnetic fields $B \simeq 15$ T.[1] Our detailed studies of the superconducting magnetic and transport properties of the REFeAs(O,F) single crystals (RE = La, Sm, Nd) reveal a promising combination of high and nearly isotropic intragrain critical current densities, which is indeed promising for applications.

[1] P.J.W. Moll, R. Puzniak, F. Balakirev, K. Rogacki, J. Karpinski, N.D. Zhigadlo, and B. Batlogg, Nature Materials, vol. **9**, 628 (2010).