

Properties of FeSeTe Thin Films

C. Ferdeghini, E. Bellingeri, V. Braccini, A. Leveratto, A. Malagoli, C. Nappi, E. Sarnelli, and G. Sylva

CNR-SPIN Corso Perrone 24, Genova, Italy

Email: carlo.ferdeghini@spin.cnr.it

Abstract— FeSeTe is an extremely interesting superconducting material among the iron-based ones for both the fact that it does not contain arsenic and for its superconducting properties, truly remarkable. If its critical temperature is relatively low, it may nevertheless be varied with a strain engineering and can be pushed up to above 20K. The critical field is very high and critical current has considerable values up to very high fields. The grain boundary properties appear to be less severe than those of HTS and, therefore, the use of this material on textured metal substrates seems an interesting way to go also for the possibility to avoid oxide buffer layers. In this paper, we present a series of researches carried out at CNR-SPIN regarding: i) the effect of the substrate and the strain on the superconducting properties, ii) the grain boundary characteristics studied on a bi-crystal, iii) the effect of proton irradiation and, iv) the possible use of metallic substrates. All these researches indicate the possibility of using coated conductors of FeSeTe for high field applications. We conclude with some hints about the possibility of electronic/sensing applications discussing preliminary results on Josephson Junctions, nano-constrictions, and SQUID.

Keywords (Index Terms)— Thin film, FeSeTe, critical current, grain boundary, SQUID.

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