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HTS Tl-based coatings for the FCC-hh beam screens

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HTS coatings have recently been proposed for beam impedance mitigation in the FCC beam screen. One of the candidate materials that can still work under the exceptional conditions of 50K, 16T, above 10ˆ5 A/cmˆ2 is the Tl cuprate TlSr2Ca2Cu3Ox (Tl-1223) that with a Tc of about 120 K, very high Hc2 and Hirr, and moderate anisotropy is a promising material for such application. This possibility is currently being explored by CNR-SPIN, TU Wien, and CERN in a joint project. In this contribution the progress at CNR-SPIN on the realization of the samples will be discussed. This method is based on the co-deposition of the metals by an electrochemical process followed by a high temperature (HT) heat treatment in order to form the superconducting phase. Nitrates of the metals are dissolved in DMSO and the deposition on conducting substrates is performed in a flat three electrodes cell. The main advantage of this low cost technique is that it is very fast and can be easily scaled up to produce coatings on arbitrary shaped pieces. We will show studies on the effect of the silver substrates surface morphology and microcrystalline structure. New approaches in order to reduce or prevent Tl evaporation during the HT heat treatment will also be addressed. The Effect of these parameters on the superconducting measurements will be reported.

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