Development of Low-Cost 2G HTS Coated Conductor at STI

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Abstract - 2G HTS coated conductors using reactive co-evaporation with cyclic deposition and reaction (RCE-CDR) of HTS films onto simplified templates have been fabricated at Superconductor Technologies Inc. RCE-CDR is a low-cost, high-yield, scalable process for deposition of HTS films. This process allows for precise and reproducible composition control during superconducting film growth. Our simplified template structure consists first of a multi-layer metal oxide film deposited by solution deposition planarization (SDP) process onto Hastelloy and stainless-steel substrates. Subsequently MgO is deposited via ion beam assisted deposition (IBAD). The HTS layers can then be grown directly onto the MgO layer or on a thin buffer layer with the RCE-CDR process. The coated-conductor architecture is thereby simplified with no substrate pre-treatment. At present we are working to optimize each component of the process sequence for pilot production of high-performance 2G HTS wire. We have fabricated 50-meter lengths and 10-centimeter widths of SDP and IBAD and will review template performance metrics. We will also review *I*c vs. length, and in-field performance data for our low-cost 2G HTS wire produced on our recently commissioned 100-meter RCE-CDR system.