Low-Cost 2G HTS Coated Conductors Scale-Up at STI

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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. Our simplified template structure consists first of a multi-layer metal oxide film deposited by solution deposition planarization (SDP) process onto Hastelloy substrates. Subsequently MgO is deposited via ion beam assisted deposition (IBAD). Multiple SDP chemistries have been screened and Design of Experiment (DOE) has been performed on IBAD process to optimize simplified template performance. Also silver and copper encapsulation on end-product has made progress. Through these improvements, hundreds of meters of templates are being fabricated. The 100m RCE-CDR is producing tens of meters of Conductus coated conductors carrying over 400A/cm of critical current. At the moment, RCE-CDR equipment scale-up is in progress to produce 1000m length HTS coated conductors. Along with the deposition chamber that will produce 1000m length, process control software is under development and this will incorporate real time process monitoring that enables fast adjustment to the process parameters during film growth for optimum HTS performance. Detailed data of Conductus wire will be presented at the conference.