

INVITED

## Scale up of YBCO Coated Conductor Processing at IGC-Superpower

Hee-Gyoun Lee, Gene Carota, Jodi Reeves, Mike Funk, Yunfei Qiao and Venkat  
Selvamanickam,

*IGC SuperPower, 450 Duane Ave., Schenectady, NY12304, USA*

Fabrication of coated conductor with high performance is crucial for the application of high temperature superconductor(HTS). IGC-SuperPower is pursuing the commercialization of coated conductor by using Metalorganic chemical vapor deposition(MOCVD) and has been developing Metalorganic chemical vapor deposition(MOCVD) to produce high-performance coated conductor as well as Pulsed laser deposition(PLD). MOCVD offers several advantages in large-volume production of coated conductor. Precursors are maintained outside the vacuum chamber and therefore refill in simple during long deposition cycles. The deposition zone can be of unlimited size since it can be configured to be as long and as wide as the showerhead. A large deposition zone is extremely beneficial for high throughput.

Building on the high performance demonstrated on short coated conductor samples by MOCVD at IGC-SuperPower previously, we are now scaling up the process to continuous deposition using reel-to-reel deposition. All steps of the coated conductor process starting from substrate to oxygen annealing are done in a reel-to-reel mode. Critical current of YBCO tapes produced in a continuous mode by MOCVD was increased systematically with improved texture of the buffer layer. Current densities over  $1 \text{ MA/cm}^2$  at 77 K have been attained in YBCO deposited in a continuous mode on the buffered substrates. We have produced short, continuously processed tapes with  $J_c$  over  $1 \text{ MA/cm}^2$  (self field at 77K) and the highest  $I_c$  was 150A for 1.2 micron-thick film and high currents were achieved over meter-long tapes. Details of the issues in scaling up to long lengths will be discussed from substrate to oxygen annealing in this presentation. This work was partial supported by Air Force Office of Scientific Research and the U.S. Department of Energy through contract with Argonne National Laboratory.