Contribution ID: **19** Type: **not specified**

Fabrication of LaMnO3 epitaxial films via electron beam physical vapor deposition

Wednesday 17 May 2017 10:45 (30 minutes)

The fabrication of ReBa2Cu3O7-δ (Re: rare earth element) (ReBCO) high temperature superconductor (HTS) based coated conductors requires development of intermediate layers between a metal tape and a superconductor which are called buffer layers. These buffer layers have to fulfill a list of requirements among which are chemical stability and compatibility with adjacent films. Inclined substrate deposited MgO and cap layer MgO are used as incident buffer layers, because they create a biaxial texture on metal substrate for growth of oriented HTS film and serve as a diffusion barrier for harmful substrate elements, respectively. However, MgO is a hygroscopic material and has high lattice misfit with ReBCO, which reasons limitations in superconducting properties such as critical temperature and critical current density. LaMnO3 (LMO) is a perspective candidate as a terminal buffer layer because of its good chemical stability with MgO and low lattice misfit with ReBCO which provides good template for HTS growth.

In this study, electron beam physical vapor deposition technique is adopted to deposit LMO on MgO film. LMO was evaporated at different substrate temperatures and O2 gas/H2O vapor flows in addition to varied layer thicknesses in order to optimize LMO film quality. Surface morphology of the films were observed using field emission - scanning electron microscopy and so far some samples were structurally and compositionally investigated using x-ray diffraction and inductively coupled plasma - atomic emission spectroscopy, respectively. Several samples with LMO layer were already deposited with DyBCO, and also critical temperature and critical current density were measured to figure out the growth quality of HTS layer on the buffer layer.

In the future work, the influences of powder particle size, deposition rate and film stoichiometry on LMO layer quality and superconductivity properties will be investigated. In plane and out of plane texture measurements of LMO layer will be done and pole figures will be plotted. Finally, reproducibility experiments will be conducted using the optimal deposition parameters.

Author: Mr ALBAYRAK, Ismail Can (LMU)

Presenter: Mr ALBAYRAK, Ismail Can (LMU)

Session Classification: Student Session