

## MOD-processed GdBCO Films Using Hybrid Fluorine-free Source

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We have fabricated  $\text{GdBa}_2\text{Cu}_3\text{O}_{7-\delta}$  (GdBCO) films on  $\text{LaAlO}_3$  (001) single crystalline substrate by the metal-organic deposition using hybrid fluorine-free source. We prepared Gd, Cu-based fluorine-free solution and Ba-trifluoroacetate solution separately. The solutions were mixed and heated to form gel state from which the final coating solution was obtained. The solution was coated on the substrate by dip coating, and the gel films were calcined at the temperature up to  $400^\circ\text{C}$  in humid oxygen atmosphere. Calcined films were fired at various high temperatures to form GdBCO phase. We also controlled the temperature at which water vapor was supplied during the process. The microstructure and superconducting properties of films were found strongly dependent on the firing conditions. Optimal processing conditions resulted in GdBCO films possessing high critical temperature ( $T_c$ ) over 90 K. The relationship between processing parameters, microstructure and superconducting properties of GdBCO films will be discussed. This work was supported by a grant from Center for Applied Superconductivity Technology of the 21st century Frontier R&D Program funded by the Ministry of Science and Technology, Republic of Korea.

Keywords : GdBCO, MOD, fluorine-free source, thin films, critical temperature.