

# Recent progress in REBCO coated conductors via RCE-DR

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Long-length GdBCO coated conductors (CCs) possessing high critical current at 77 K in self field up to ~800 A/cm-width are being produced via a reactive co-evaporation deposition and reaction (RCE-DR) process by SuNAM Co. in Korea. Recently, we have reported details on this high throughput process [J. H. Lee *et al.*, Supercond. Sci. Technol. **27** (2014) 044018]. Due to a very high conversion rate from an amorphous precursor film into the GdBCO film, an overall processing speed for producing the GdBCO film is faster than 120 m/h, which we believe can meet the industrial requirements for real applications in terms of production speed and price. While this technology has been continuously improved by SuNAM for the achievement of higher performance and higher yield of GdBCO CCs, there have been some challenging problems, including processing optimization reported by J.H. Lee *et al.* and relatively weak pinning properties reported by S.M. Choi *et al.* [IEEE Trans. Appl. Supercond. **23** (2013) 8001004]. Since accurate information on the stability diagrams of the REBCO phases in low oxygen pressures is critical for the optimization of the RCE-DR process, we have investigated those for RE = Gd, Sm, and Y. Among these REBCO phases, the stability phase diagram of GdBCO has already been reported by J.W. Lee *et al.* [J. Alloys Compd. **602** (2014) 78]. Interestingly, the stability phase diagrams of REBCO (RE= Gd, Sm, Y) are quite different from each other, particularly in their decomposition products, suggesting that the growth conditions should be properly modified for each REBCO. On the other hand, to improve pinning properties, we have focused on the refinement of Gd<sub>2</sub>O<sub>3</sub> particles trapped in the GdBCO matrix, and also on the defect control by a post-annealing process in a low oxygen pressure. In this talk, recent progress in REBCO coated conductors via the RCE-DR process will be reviewed, then the key factors for the fabrication of high performance REBCO CCs will be discussed on the basis of their stability diagrams, and finally some of our meaningful efforts to overcome the weak pinning will be presented.

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