

## The Latest Trends of MOD REBCO Superconducting Coated Conductors in SWCC

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Cardwell - The REBCO (RE: Rare-earth, REBCO: REBa<sub>2</sub>Cu<sub>3</sub>O<sub>y</sub>) high-T<sub>c</sub> superconducting coated conductors are well known as one of the candidates of superconducting conductors for practical use. SWCC Showa Cable Systems developed low-cost REBCO coated conductors which are consisting of several layers. REBCO coated conductors have been developed using the metal-organic deposition (MOD) process including trifluoroacetates (TFA), and this since 1999. In 2008, we successfully developed 500 m-class YBCO coated conductors which had the critical current (I<sub>c</sub>) values of 310 A/cm-width at 77 K in self field. Moreover, we successfully developed a way for introducing artificial pinning centers (APC) to control the degradation of superconducting properties in magnetic fields. The way was substitutions of Gd for a part of Y elements and introduction of nano-particle BaZrO<sub>3</sub>, which was a compound of Ba, O and Zr added in the raw material, in the superconducting layer using a large batch type furnace [1]. We successfully fabricated 100m-class REBCO with APC coated conductors which had I<sub>c</sub> values of over 50 A/cm-width at 77 K in 3 T [2]. We will improve performance of REBCO coated conductors and develop products of superconducting applications, from now on. We have named the MOD REBCO coated conductors with APC “nPAD-YBCO<sup>®</sup>” (nPAD-YBCO<sup>®</sup>: nano particle artificial pinning center distributed YBCO). Recently, we successfully developed the low heat leakage superconducting current leads using “nPAD-YBCO<sup>®</sup>” for the superconducting equipment. Moreover, the nPAD-YBCO<sup>®</sup> superconducting current leads have been commercialized since 2013.

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[2] IEEE Trans. Appl. Supercond. 23 No.3 2013 6601704.

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