

## HTS Wire Development and Applications in SEI

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With over 40 years superconductivity R&D experience, large-scale mass production facilities for High Temperature Superconductor (HTS) products are available in Sumitomo Electric Industries, Ltd. (SEI). The drastically innovative bismuth-based HTS wire (DI-BSCCO) has developed based on the controlled-overpressure (CT-OP) process, and DI-BSCCO is now at mass production stage. Unlike a conventional BSCCO wires, DI-BSCCO has several features due to 100% density of BSCCO filaments such as high critical current up to 150A, long length up to 1,500 m, anti-ballooning in LN<sub>2</sub>, and excellent mechanical properties without additional sheath. DI-BSCCO is now called as the 3G (3<sup>rd</sup> generation) HTS wire. Those with BSCCO (1G&3G) wire experience will be in the best position to take advantage of the 2<sup>nd</sup> generation (2G) wires. The use of the rare earth element Holmium allows for improved deposition in comparison to more commonly-used Yttrium. HoBCO coated conductors on flexible metal substrates are promising for HTS applications such as cable and magnet. In order to realize HoBCO conductors with high I<sub>c</sub>, high strength and long length, continuous deposition process such as PLD and MOD have been developed. Several 3-in one HTS cable project are in progress under international collaboration based on the successful completion of the world's first long-term test of 3-phase in 1 cryostat 100m length HTS cable in Japan. Especially, SEI has contracted with KEPRI to construct a complete 100 meter HTS cable system in Korea. The 100 meter underground cable is scheduled for installation at the Gochang KEPCO test site. SEI and Japanese partners have developed the world's first all HTS motor cooled by LN<sub>2</sub>. The motor has unique features such as smaller and lighter than conventional motors, higher fuel efficiency, easy increase of power output, and easy to handle. A part of HoBCO development was supported by NEDO as collaborative research and development of fundamental technology for superconductivity applications.

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