

New Japanese National Project on Coated Conductors and Coiling Technology

February 10, 2014 (HE84). A new Japanese National Project on coated HTS conductors, named “Development of Fundamental Technologies for HTS Coil”, started at the end of December 2013. The main subject of this project is the development of HTS coiling technologies for medical uses in MRI and Heavy Ion Irradiation Accelerator magnets. This project comprises five tasks: two of them are directed towards the developments of magnets for 3T and 10T MRI systems, and two others towards magnets for accelerators and gantries.

The fifth task addresses fundamental technologies for future medical applications. It includes R&D on coated conductors and their coiling, cooling and evaluation technologies. For the future MRI systems proposed are He-free MRI 3 tesla magnets cooled by liquid N₂ and 10 tesla magnets cooled by Ne gas. Also, compact accelerators with low power consumption and extremely low heat generation are suggested. The Task 5 is to be performed by ISTEC.

To make possible these future medical applications, the project goals include long coated conductors having high in-field I_c and extremely low heat-generating properties. The latter require the development of coated conductors with uniform I_c distribution, filamentation to control AC losses, and near zero resistance splicing. Additionally, the control technology of the relaxation behavior of magnetization in tape and coil shape has to be determined. Coiling technologies have to be developed for the advanced coated conductors defined above.

Typical goals for coated conductors in the fifth theme (R&D of the common fundamental technologies) are as follows:

- 200m length - 600A/cm-width @ 65K, 3T and 1000A/cm-width @ 35K, 10T,
- 200m length - filament width $\leq 500\mu\text{m}$ in 5mm wide tapes - filament I_c spread $\leq 5\%$.

In this preliminary highlight, we are able to report on some details only for Task 5. Hopefully, more information on the other tasks will be forthcoming soon.

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