Contribution ID: **820** Type: **Invited Oral Presentation**

M1Or3A-01 [Invited]: My studies of Nb3Sn, V3Ga and Nb3Al wires and tapes in National Research Institute for Metals(NRIM)

Monday, 22 July 2019 16:00 (20 minutes)

When I joined Tachikawa's group in NRIM(now NIMS) in 1978, they have almost finished the research of bronze–process and they were carrying out many kinds of impurity additions to Nb3Sn wires. Soon they found that Ti addition is very effective to enhance Jc values at high field region. I measured Hc2 values of various impurity added bronze processed Nb3Sn wires at MIT, and found that Ti or Ta addition increased Hc2 from ˜22T(pure Nb3Sn with bronze) to ˜26T. I also studied in situ process for Nb3Sn and V3Ga wires and tapes. The in situ V3Ga tapes were used as conductors of innermost coils of the 18T superconducting magnet constructed in NRIM.
Nb3Al is one of the promising candidates for high field magnets because of its higher Hc2 and stronger mechanical tolerance than Nb3Sn. Tachikawa and I carried out the synthesis of high-Jc Nb3Al and Nb3(Al,Ge) tapes using high energy laser or electron beam irradiations to Nb-Al and Nb-Al-Ge precursor tapes. Precursor tapes were prepared by the powder-in-tube method. By the mechanical working to tapes Al and Nb particles were elongated into fibers. The high energy beam irradiation was continuously carried out along the tape length. As the power density was high and the irradiation time was short, the tapes were heated and cooled much faster than a tape heat-treated by a conventional method. As a result stoichiometric Nb3Al and Nb3(Al,Ge) compounds were formed without any excess grain coarsening. This led to the high Jc values at high field region. For example, Jc of electron beam irradiated Nb3(Al,Ge) tape reached ˜28,000A/cm2 in 25T at 4.2K. This was the highest Jc at that time.

Primary author: Dr KUMAKURA, Hiroaki (National Institute for Materials Science)

Presenter: Dr KUMAKURA, Hiroaki (National Institute for Materials Science)

Session Classification: M1Or3A - Memorial Session: Dedicated to Prof. Tachikawa