Abstract

Kobe Steel has developed brass matrix DT (distributed tin) method Nb₃Sn wires, aiming to achieve both high Jₚ performance and high robustness, in collaboration with NIMS.

In this work, Measurement of Non-Cu Jₚ of the developed brass matrix DT wires. Microstructural study on diffusion reaction behavior, especially during the pre-annealing, towards more detailed optimization of process parameters and further Jₚ improvement.

Non-Cu Jₚ-B characteristics for fabricated wires

Comparison of Jₚ of high performance DT Nb₃Sn

Microstructural change

After 400 °C/200 h + 535 °C/50 h

Problem of Ti Segregation, when doping Ti to Sn core

Conclusion

- Brass DT Nb₃Sn wires have been developed.
- Zn addition results in β-CuZn formation, suppressing growth of δ + ε phases that often cause void growth.
- Zn addition improves Sn and Ti distribution in the Nb filament pack.