Contribution ID: **1148** Contribution code: **MOCN1** Type: **Contributed Oral Presentation**

Nb3Sn cavity development based on vapor deposition method at KEK

Monday 2 June 2025 15:00 (20 minutes)

Nb_3Sn is one of the most promising materials for the next generation of superconducting RF (SRF) cavities. One key advantage is that Nb_3Sn cavities can achieve high Q-values at 4 K, whereas conventional Nb cavities require cooling to 2 K. This enables the operation of SRF cavities using conduction cooling, thereby eliminating the need for liquid helium, unlike conventional SRF cavities that require immersion cooling. Since around 2019, KEK has been conducting Nb_3Sn deposition tests on single-cell cavities using the Sn vapor diffusion method and has steadily improved cavity performance. Additionally, a small deposition furnace dedicated to sample studies was constructed to investigate the relationship between Nb_3Sn film quality and deposition parameters. In this presentation, we will report the results of sample deposition tests and RF measurements of single-cell Nb_3Sn cavities.

Footnotes

Paper preparation format

Word

Region represented

Asia

Funding Agency

This work was supported by Japan Grant Number JPMXP1423812204 and JSPS KAKENHI Grant Numbers JP22K18130.

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Session Classification: MOCN:Accelerator Technology and Sustainability (Contributed)

Track Classification: MC7: Accelerator Technology and Sustainability: MC7.T07 Superconducting RF