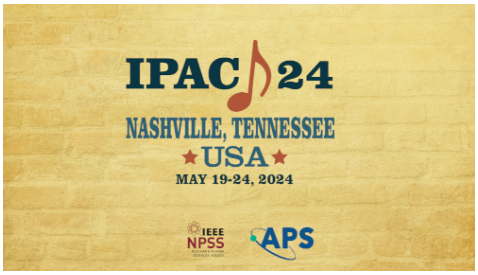

Contribution ID: **1228** Contribution code: **THPS64** Type: **Poster Presentation**

Statistical evaluation of mechanical properties of RRR300 niobium sheets for SRF cavities

Thursday, 23 May 2024 16:00 (2 hours)

Tokyo Denkai has been producing niobium for superconducting cavities since 1985. We have also produced niobium for L-band cavities since the beginning of their development, and have a large number of production records. In particular, more than 20,000 pieces have been delivered to TESLA based on the XFEL-007 specifications for the European XFEL, LCLS-II, LCLS-II HE, and SHINE projects. In this report, we present a statistical evaluation of measured data on the actual mechanical properties of niobium sheets in a mass production of niobium sheets based on nearly identical specifications. Specifically, histograms of hardness, RRR, and tensile testing (rolling and transverse direction) of niobium sheets were drawn to evaluate the data variability. The data for all items were normally distributed, indicating that quality was controlled. In addition, the relationship between rolling direction and all tensile test items (yield stress, maximum stress, and elongation) were examined. Positive correlations were observed for yield stress and maximum stress. I report on the quality data and statistical results of the same product over a period of more than 10 years.

Footnotes

Funding Agency

Paper preparation format

Word

Region represented

Asia

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Session Classification: Thursday Poster Session

Track Classification: MC7: Accelerator Technology and Sustainability: MC7.T35 Advanced Manufacturing Technologies for Accelerator Components