SRF2025 TOKYO

22ND INTERNATIONAL CONFERENCE ON RF SUPERCONDUCTIVITY

September 21-26, 2025

Contribution ID: **47** Contribution code: **TUB03** Type: **Invited Oral Presentation**

Advancements in HF-free bipolar pulsed electropolishing for next-generation superconducting cavities

Tuesday 23 September 2025 11:40 (20 minutes)

Hydrofluoric acid (HF)-free bipolar pulsed electropolishing (BPEP) offers an environmentally sustainable alternative to conventional Buffered Chemical Polishing (BCP) and Electropolishing (EP) techniques for superconducting radiofrequency (SRF) cavities. Recent studies at Jefferson Lab have demonstrated that a single-cell 1.3 GHz niobium cavity processed using HF-free BPEP achieved an accelerating gradient Eacc of 35 MV/m with a quality factor Q0 of 1E10 at 2 K, following extensive research and optimization. This talk will highlight the challenges encountered in developing this technique, key insights gained from experimental studies, and ongoing efforts to enhance its capabilities. In particular, we will explore its potential for refining Nb3Sn-coated niobium cavities via vapor diffusion techniques and for electroplating Nb3Sn films onto various cavity substrates, contributing to the advancement of high-performance SRF systems.

I have read and accept the Privacy Policy Statement

Yes

Footnotes

Funding Agency

Authors: TIAN, Hui (Thomas Jefferson National Accelerator Facility); GENG, Rong-Li (Thomas Jefferson National Accelerator Facility)

Co-author: Dr GE, Mingqi (Thomas Jefferson National Accelerator Facility)

Presenter: GENG, Rong-Li (Thomas Jefferson National Accelerator Facility)

Session Classification: Tuesday Oral Session: B

Track Classification: MC3: Cavities