

Recent progress on HF-free surface treatment by bipolar pulsed electropolishing for SRF Nb cavities

Thursday 29 August 2024 16:00 (2 hours)

The bipolar pulsed electropolishing (BPEP), due to its HF-free feature, can offer much safer, more environmentally friendly, and lower-cost operation compared to the conventional electropolishing, using concentrated HF and H₂SO₄ as electrolyte. Jefferson Lab has developed the BPEP system using diluted H₂SO₄ only for implementing final surface processing of niobium SRF cavities, including single cells, 7-cell CEBAF C100 cavity, and 9-cell TESLA-style cavities. The BPEP-treated cavity, followed by 120°C baking, has achieved an accelerating gradient (Eacc) of 37 MV/m with a quality factor (Q0) above 1e10 at 2K, which demonstrated the success of the system's development. The detailed BPEP parameter optimization and study of the surface engineering by BPEP will also be presented.

Footnotes

Funding Agency

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

Co-authors: VALENTE-FELICIANO, Anne-Marie (Thomas Jefferson National Accelerator Facility); STALLWORTH, Ernest (Jefferson Lab); TIAN, Hui (Thomas Jefferson National Accelerator Facility); MUSSON, John (Thomas Jefferson National Accelerator Facility); LESTER, Mark (Thomas Jefferson National Accelerator Facility); BROCK, Natalie (Thomas Jefferson National Accelerator Facility)

Presenter: Dr GE, Mingqi (Thomas Jefferson National Accelerator Facility)

Session Classification: Thursday Poster Session

Track Classification: MC4: Technology: MC4.8 Superconducting RF