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# Improving the performance of mid-T baked niobium cavities through post-bake surface treatment

*Thursday 25 September 2025 14:30 (3 hours)*

Medium temperature (mid-T) baking of niobium superconducting radio-frequency cavities at 300–350 ℃ in a vacuum furnace is known to enhance the quality factor ($Q_0$). However, despite this improvement, cavities treated with this process often prematurely quench at relatively low accelerating fields. This limitation is suspected to arise from the formation of surface contaminants, such as niobium carbides, during the furnace bake. To investigate the influence of potential surface contamination, this study applied an ultralight chemical removal to 1.3 GHz and 650 MHz single-cell cavities that had undergone medium-temperature baking. The removal of the top RF surface layer led to a notable improvement in the quench field and $Q_0$, indicating a beneficial effect of eliminating possible surface residues introduced during the bake.

## I have read and accept the Privacy Policy Statement

Yes

## Footnotes

## Funding Agency

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