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Studies of Nb in Preparation for Gold Capping Layers

Bulk niobium is the standard material of choice for superconducting radio frequency (SRF) cavities for accelerator applications. However, the native niobium oxide that forms when niobium is exposed to atmosphere may inhibit cavity performance. Ongoing work at Cornell University proposes to chemically remove the niobium oxide and replace it before it can reform with a sub-nm layer of non-oxidizing gold deposited with electrochemical deposition. Here we report progress on cavity-scale and sample-scale testing of this work. We report RF results characterizing the baseline performance of the 2.6 GHz cavity to be used in the study, as well as sample imaging and surface characterization of comparable niobium samples.

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