

Metallurgical Analyses of Niobium for Superconducting Radio Frequency Cavities
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ABSTRACT

Superconducting radio frequency cavities have gained use in accelerator systems for particle physics research. Careful production of the cavities has the greatest influence on their efficiencies, as uniform interior surfaces are required for high accelerating gradients. Small variations in the surfaces of these cavities, such as inclusions, voids, and cracks, cause large deficiencies in the accelerating gradients. Processes to remove such deficiencies usually include eddy current scanning, buffered chemical polishing, and electropolishing. These methods do not provide a consistent means of producing a uniform interior surface. The effectiveness of tumbling as a mass finishing technique was analyzed. This process completely removed the weld line. The effects of weld line removal on cavity efficiencies will be examined.