

thinfilms and NEW IDEAS for SRF

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Optimization of mechanical polishing of Niobium for SRF applications

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The reduction of construction and operation costs are major aims for future superconducting radio-frequency (SRF) applications. So as to reduce the construction cost of the particle accelerators, the standard expensive chemical treatments (electropolishing (EP) or buffered chemical polishing (BCP)) of bulk Niobium (Nb) cavities can be significantly reduced or even suppressed thanks to mechanical polishing (MP) techniques. MP of Nb is also really promising to prepare high quality substrates for thin film deposition of alternative superconductors (Nb₃Sn, multilayers...). Since quality of thin-film depends on the quality-state of the substrate, development of the mechanical polishing procedure of substrate is a key point to produce high quality films. A 2-steps MP method, inspired from metallographic techniques has been developed and optimized on Nb for SRF applications to achieve mirror-finished surfaces on flat samples. The surface morphology, damaged layer (EBSD) and surface pollution (SIMS) analysis are presented.

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