ABSTRACT

Superconducting radiofrequency accelerators are a key tool of frontier science. Moving SRF accelerator technology forward requires, among other things, higher particle energies, increased beam current and reduced cost per unit of performance. Accelerator performance is chiefly controlled by the superconducting niobium cavities at their heart. Historically, many advances in SRF cavities have come empirically, through the iterative procedure of modifying processing and then performance testing. However, material structure is directly responsible for performance. Understanding, the link between processing, structure, and performance will streamline and accelerate the research process. In order to connect processing, structure, and performance, accurate and robust materials characterization methods are needed. Here several examples are presented, showing how two methods in particular, SIMS and EBSD, are being used to further understanding of materials based SRF technologies.

BIOSKETCH

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