Surface Preparation of Metallic Substrates for Quality SRF Thin Films

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Abstract
Surface preparation is an essential prerequisite for thin film depositions. Rough or chemically impure surfaces adversely affect the nature of the thin film. Understanding the properties of the substrate and their influence on the quality of the thin film is necessary to transfer thin film deposition technologies to SRF cavity applications. A substrate that is flat, flat, flat, sufficient grain size, and is chemically pure is the ideal starting point for thin film depositions. A method for copper substrate preparation is reviewed for niobium thin film deposition that provides epitaxy on large, fine grain and single crystal copper. Preliminary data on medium substrate preparation will also be included.

Substrate Surface Characterization

Conclusions

+ Method for low RMS copper with a highly ordered crystalline surface is reported.
+ Initial results for Nb mechanical and electropolishing are compared to Cu.
+ Demonstrated the suitability of Cu substrates prepared by reported method to support Nb epitaxy in ECR deposition.