

## DEVELOPMENT OF SIMS STANDARDS FOR MEASUREMENT OF H, C, O, N IN Nb

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### *Abstract*

Performance of SRF cavities depends on material within the shallow RF penetration depth. C, N, and O are of particular interest as interstitial contaminants and earlier work suggested very high H concentration\*. Secondary Ion Mass Spectrometry (SIMS) has the sensitivity to quantitatively measure these species in the region of interest. However, standards for quantitative SIMS analysis of these elements in Nb did not exist. Initial attempts to develop an ion implanted standard were unsuccessful because of the roughness of the Nb surface. In this study, Nb samples were specially chemical mechanical polished and then subsequently treated with a light BCP. The result is a surface finish suitable for SIMS analysis and implantation standards. Ion implants of C, N, O, and deuterium (D) were obtained in Nb (and simultaneously in Si for dose verification). D was implanted to characterize H, and to avoid the high H background. The results show that D is apparently very mobile in Nb, and another approach will be required to quantify this element. This multi-element standard has already been of great benefit in characterization of C, O, and N in polycrystalline and large grain Nb\*\*.

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