

Abstract Submitted
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Modification of Biased Bulk Nb Surface with Ar/Cl₂ Microwave Discharge Plasma¹ J. UPADHYAY, M. RASKOVIC, S. POPOVIC, L. VUSKOVIC, Department of Physics, Old Dominion University, Norfolk, VA — Microwave glow discharge in Ar/Cl₂ mixture was used for plasma treatment of bulk niobium surface. The samples were connected to a negative d.c. and radio-frequency bias. This treatment consisted of simultaneous sputtering, favored by sheath formation, and etching, favored by the presence of reactive chlorine atoms. Both of these processes enable the removal of impurities and increase smoothness of the Nb surface [1]. The rate of surface removal was correlated with the concentration of Cl radicals (Cl, Cl⁺, Cl⁻) in the discharge and the temperature of sample. To determine these parameters we developed a set of techniques for a comprehensive plasma characterization. Optical and electrical methods were used to determine plasma parameters. Plasma emission actinometry was used to estimate the absolute densities of Cl, Cl⁺ and Cl₂ under the discharge conditions optimal for the surface treatment. [1] M. Raskovic, et al., Nuclear Instruments and Methods in Physics Research A 569 663–670 (2006).

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