

In-situ study of Niobium/oxygen interfaces

M. Delheusy^{1,2}, A. Stierle¹, C. Antoine², H. Dosch¹

¹*Max-Planck-Institut für Metallforschung, Heisenbergstr. 3, D-70569 Stuttgart, Germany*

²*Commissariat à l'énergie atomique, Daphnia/SACM - Centre d'Etude de Saclay F-91191 Gif sur Yvette*
E-mail : delheusy@mf.mpg.de

Impurities located in the vicinity of metal/oxide interface can strongly modify the physical properties of materials in the near surface region. In particular, interstitial oxygen atoms dissolved at the Nb/Nb oxide interface might affect the superconducting properties of the metal. Understanding the oxygen distribution and interface structure variation upon various surface treatments is of first interest for the future improvements of superconducting radiofrequency cavities made of Niobium. In this work, dry and wet oxidation of a Nb(110) single crystal and the effect of a mild baking (~120°C) will be investigated by surface sensitive X-ray techniques : Crystal Truncation Rods (CTR) under Grazing Incidence X-ray Diffraction (GIXD), Reflectivity and Diffuse Scattering measurements. On the poster, we will present model calculations and how the interfacial structure, its roughness, the oxygen depth profile and the distortions induced in the Nb lattice close to the interface will be monitored using in-situ X-ray Diffraction techniques.