

IN-SITU INVESTIGATION OF THE Nb/OXYGEN INTERFACES - CORRELATION WITH THE PROPERTIES OF THE Nb RF SUPERCONDUCTING CAVITIES

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Abstract

The effect of mild thermal treatments (120°C-300°C, UHV conditions) on the depth-distribution of interstitial oxygen impurities as well as on the atomic structure at the Nb(110)/oxide and Nb(100)/oxide interfaces have been investigated by x-ray surface sensitive techniques. In-situ diffuse scattering, crystal truncation rods and x-ray reflectivity measurements have been performed under grazing incidence geometry. In particular, we have shown the occurrence of a specific diffuse scattering as the signature of isolated interstitial oxygen atoms randomly distributed in the vicinity of the niobium surface (3-500 nm, nanometer resolution). Their behaviour has been monitored upon the various heat treatments, along with the evolution of the oxide layer.

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