

Characterization of High Purity Ni(100)-foils for Positron Moderation in a Novel Positron Microbeam Setup

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The positron beam facility NEPOMUC at the FRM II provides a mono-energetic positron beam with an intensity of 10^9 moderated e^+/s . The CDB spectrometer at NEPOMUC enables depth dependent and spatially resolved defect studies by using conventional doppler broadening spectroscopy(DBS), and element-specific measurements with coincident DBS. For depth dependent measurements, the positron implantation energy can be adjusted from 0.5 to 30 keV. The lateral resolution amounts to 300 μm .

For the development of a positron micro beam with a diameter of $<5 \mu\text{m}$ a 100 nm thick Ni(100) remoderation foil will be installed in transmission geometry to increase the beam brightness. To achieve a high yield of re-emitted moderated positrons, the Ni foil has to be annealed and surface contaminations such as carbon and oxygen have to be removed. Therefore, temperature-dependent XPS and DBS measurements were performed for characterizing the surface contaminations and for determining the annealing behaviour.

Primary author: GIGL, Thomas

Co-authors: Mr PIOCHACZ, Christian (Heinz Maier-Leibnitz Zentrum (MLZ) and Physik Department E21, Technische Universität München, Lichtenbergstr. 1, 85748 Garching, Germany); HUGENSCHMIDT, Christoph; Mr REINER, Markus (Heinz Maier-Leibnitz Zentrum (MLZ) and Physik Department E21, Technische Universität München, Lichtenbergstr. 1, 85748 Garching, Germany)

Presenter: GIGL, Thomas

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