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Mo oxides studied by means of Mössbauer and Perturbed Angular Correlation Techniques

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Using Perturbed Angular Correlations (PAC) and emission Mössbauer (eMS) techniques it is possible to measure hyperfine electric and magnetic fields in the material, even with very small concentrations of the implanted probes (ppm). The techniques, using exotic beams available at ISOLDE, lend itself to studying Molybdenum oxides since, due to these small concentrations, the underlying structure of the system under investigation is essentially unaltered and an unambiguous picture of physical processes can be obtained. In comparison to transition-metal oxides, the Molybdenum oxide compounds are particularly attractive due to the 2 D structure and to the ability of the molybdenum ion to change its oxidation state. When the probe atoms are located on substitutional Cd sites, after annealing at 450℃, the residual detrimental effects from ion implantation are minimal not disturbing the study of the component of interest. The PAC data show evidence for Cd occupying regular sites of the MoO3 lattice. Two EFGs are observed and the fraction of probes interacting with EFG1/EFG2 increase/decrease as a function of measuring temperature. This behaviour hints to the activation of an electronic localized state at the Cd dopant, as a function of temperature to be further investigated.

Primary author: Dr SCHELL, Juliana (Experimentalphysik, Universität des Saarlandes, Germany)

Co-author: MARTINS CORREIA, Joao (Instituto Superior Tecnico (PT))

Presenter: Dr SCHELL, Juliana (Experimentalphysik, Universität des Saarlandes, Germany)

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