

X-ray spectroscopy of transition metal oxides

Frank de GROOT

(Debye Institute of Nanomaterials Science, Utrecht University, Netherlands)

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Amphithéâtre SOLEIL

Some new developments in x-ray absorption (XAS) and resonant inelastic x-ray scattering (RIXS) will be discussed. An introduction is given of XAS, including the oxygen K edge, metal K edge and metal L edge [1,2].

The second part of the talk deals with resonant inelastic x-ray scattering (RIXS) In 2p3d RIXS one scans through the 2p XAS edge and measures the low energy excitations, including phonons, magnons, dd-excitations and charge transfer. The 100 meV resolved 2p3d RIXS spectra of Ruby (Cr in Al_2O_3), Fe_3O_4 and LaCoO_3 will be discussed [3,4]. The present experimental resolution of 30 to 100 meV allows the detailed observation of the electronic structure, including the determination of crystal field parameters, covalency parameters and spin-orbit coupling, but also the momentum dependence of magnons and other low energy excitations. Related to the RIXS measurements is the analysis of Fluorescence yield (FY) detected x-ray absorption spectra (XAS), including the intrinsic deviations of FY-XAS spectral shape from the XAS spectrum that is important for measurements with x-ray free electron lasers [5,6].

- [1] *Core Level Spectroscopy of Solids Frank de Groot and Akio Kotani (Taylor & Francis CRC press, 2008)*
- [2] *Download the x-ray spectroscopy simulation software at <http://www.anorg.chem.uu.nl/CTM4XAS/>*
- [3] *Huang et al. Nature Comm. 8, 15929 (2017).*
- [4] *Tomiyasu et al. Phys. Rev. Lett. 119, 196402 (2017)*
- [5] *F.M.F. de Groot, Nature Chemistry 4, 766 (2012)*
- [6] *Mitzner et al. J. Phys. Chem. Lett. 4, 3641 (2013)*



Ce séminaire sera suivi d'une pause café

Formalités d'entrée : accès libre dans l'amphi du pavillon d'Accueil.

Si la manifestation a lieu dans le Grand Amphi SOLEIL du Bâtiment Central merci de vous munir d'une pièce d'identité (à échanger à l'accueil contre un badge d'accès)

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L'Orme des merisiers - Saint-Aubin - BP48 - 91192 GIF S/YVETTE cedex

www.synchrotron-soleil.fr/fr/evenements

CONTACT : sandrine.vasseur@synchrotron-soleil.fr

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