

ABSTRACT

1s2p Resonant Inelastic X-ray Scattering Natural Circular Dichroism

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1s2p RIXS-Magnetic Circular Dichroism (RIXS-MCD) [1-3], is a recently discovered, bulk-sensitive element-specific photon-in photon-out spectroscopy, using circular polarized hard x-rays to probe the local magnetism, usually at the 1s pre-edge of 3d transition metal oxides. In this talk, we will demonstrate that this same technique can be used to study chiral crystals, which we call “RIXS-Natural Circular Dichroism (RIXS-NCD)” and which gives a dichroic signal resulting from the chiral nature of the probed material. We present the first results on this new spectroscopy on cobalt- and manganese- based chiral compounds.

[1] “Strong K-edge Magnetic Circular Dichroism Observed in Photon-in-Photon-out Spectroscopy”, Sikora, M., Juhin, A., Weng, T.-C.), Saintavit, Ph., Detlefs, C., de Groot, F. and Glatzel, P., Physical Review Letters, Vol.105 (3), 2010. DOI:10.1103/PhysRevLett.105.037202

[2] “1s2p resonant inelastic x-ray scattering-magnetic circular dichroism: A sensitive probe of 3d magnetic moments using hard x-ray photons”, Sikora M., Juhin, A., Simon G., Zając, Biernacka, K., Kapusta Cz., Morellon, L., Ibarra M.R. and P. Glatzel Journal of Applied Physics, Vol. 111 (7),2012. DOI: 10.1063/1.3670064

[3] “X-ray magnetic circular dichroism measured at the Fe K-edge with a reduced intrinsic broadening: x-ray absorption spectroscopy versus resonant inelastic x-ray scattering measurements”, Juhin A., Saintavit Ph., Ollefs K., Sikora M., Filipponi A., Glatzel P., Wilhelm F. and Rogalev A., Journal of Physics: Condensed Matter, Volume 28, Number 50, 2016.

[4] “1s2p Resonant Inelastic X-ray Scattering Magnetic Circular Dichroism as a probe for the local and non-local orbitals in CrO₂”, Zimmermann, P., Bouldi, N., Hunault, M.O.J.Y.), Sikora, M., Ablett, J. M., Rueff, J.-P., Lebert, B., Saintavit, Ph., de Groot, F.M.F. and Juhin, A., Journal of Electron Spectroscopy and Related Phenomena, Volume 222,74 87,2018. DOI: 10.1016/j.elspec.2017.08.004