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Hard X-ray spectroscopy of magnetic thin films for spintronic devices

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High tunnel magneto-resistance is a characteristic of high quality magnetic tunnel junctions (MTJs) indicating a high spin polarization and epitaxial interfaces. We have studied the electronic properties of buried thin films promising as base electrodes for MTJs. In particular, the influence of the stoichiometry and annealing on the shape of the core levels and the valence band was investigated.

The main method used is hard X-ray photoelectron spectroscopy where the excitation by hard X-rays in the range of typically 3-10 keV produces energetic photoelectrons which carry electronic structure information from well below the sample surface (10-30 nm) making it a powerful tool for studies of complex materials, buried nano-structures and multi-layered structures relevant for device applications. The experiments were carried out at PETRA beamline P09.

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