

Direct Observation of Antiferromagnetic Domain Structures by UV Photoemission Electron Microscope

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Direct observation of antiferromagnetic (AFM) domain structures of NiO(001) surface is possible by using a spectroscopy photoelectron low energy electron microscope (SPELEEM) and commercial UV Hg excitation light source without any polarizers. The principle is based on magnetic linear dichroism (MLD) effect, where contrasts of different domains are produced according to the relative angles between the antiferromagnetic axis and the linearly polarized light. The observed AFM domain structures are strongly affected by both bulk AFM domain structures and the stresses induced during the sample cleaving process. Moreover, the AFM domain structures are found irreversible when the sample is heated over Néel temperature and cooled down again. The possibility to image AFM domain structures independent from synchrotron radiation and polarizer may be attractive.

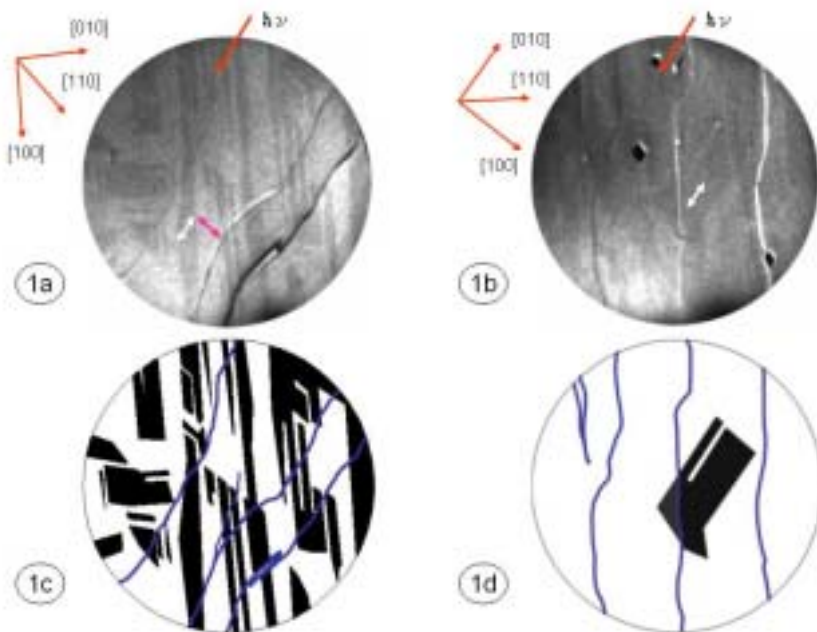


Figure 1. (1a) PEEM image of NiO(001) with field of view $75 \mu\text{m}$ obtained by using Hg arc lamp and SPELEEM. (1b) PEEM image with the same field of view after 45° in-plane rotation. (1c) and (1d) show the roughly drawn corresponding schematic illustrations of the domain contrasts for (1a) and (1b), respectively. The antiferromagnetic axis directions are overwriting on the images.