

Domain structures of patterned Co thin films deposited on low-index Cu surfaces

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The different domain structures between continuous and patterned Co thin film elements are studied by the X-ray Photoemission Electron Microscope (PEEM). Using an *in-situ* mask, we are able to prepare micron-sized elements on two low-index copper surfaces; Cu(100) and Cu(110). The impact of Cu crystal orientation on continuous Co film is significant; a layer-by-layer growth mode on Co/Cu(100) with the in-plane easy axis lying along $\langle 011 \rangle$ direction[1], and a thickness-dependent growth mode for Co deposition on Cu(110) whose in-plane easy axis exhibits a 90° switching upon the subsequent carbon monoxide adsorption[2]. For these two cases, substrate induced uniaxial anisotropy plays a dominant role in determining the magnetic properties of Co layer. For the patterned thin film element on single crystal surface, the geometry constrain introduces additional shape anisotropy. As a result, it is expected that the domain structures of Co elements to be different from those continuous films (see Fig. 1). In this study, full-field PEEM images with magnetic contrast were constructed with polarized photons irradiating the sample. The X-ray images are then used to examine the different domain structures between continuous and patterned films.

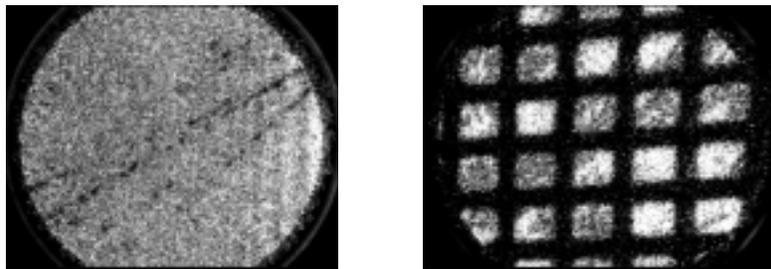


Figure 1: Domain structures of 8 Å thick, as-deposited continuous and patterned Co films on Cu(100).

References

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