

Abstract Submitted
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Soft x-ray ptychography studies of nanoscale magnetic and structural correlations in thin SmCo₅ films¹ P. FISCHER, MSD LBNL Berkeley CA 94720, X. SHI, ALS LBNL Berkeley CA 94720, V. NEU, D. ELEFANT, IFW Dresden Germany, J.C.T. LEE, D.A. SHAPIRO, M. FARMAND, T. TYLISZCZAK, W. SHIU, S. MARCHESINI, S. ROY, S.D. KEVAN, ALS LBNL Berkeley CA 94720 — Soft x-ray ptychographic imaging was applied to probe an amorphous 50 nm thin SmCo₅ film prepared by off-axis pulsed laser deposition and exhibiting a strong perpendicular magnetic anisotropy. Amplitude and phase contrast images, retrieved at photon energies near the cobalt L₃ resonance, were used to identify and characterize magnetic and structural features with a spatial resolution of about 10 nm. Aside from the common magnetic labyrinth domain pattern, nanoscale structural inclusions were identified that are primarily located in close proximity to the magnetic domain walls. X-ray absorption spectroscopy suggests that these inclusions are nanocrystalline Sm₂Co₁₇ phases with nominally in-plane magnetic anisotropy. Our results indicate that x-ray ptychographic imaging enables fruitful studies of magnetic and structural correlations at length scales relevant to emerging magnetic and spintronic devices.

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