

【MP-05】

Magnetic Properties of Monolayer-Thickness Co Films on InP(2×4) Reconstruction Surface

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We have investigated magnetic properties of monolayer(ML)-thickness Co films deposited on InP(2×4) reconstruction surface using in situ Surface Magneto-Optical Kerr Effects (SMOKE) measurement system. InP(2×4) reconstruction surface, obtained by repeated sputtering and annealing, was confirmed by RHEED and STM measurements. We have observed three distinguishable regions showing different magnetic properties depending on the Co thickness. In the Co film thickness smaller than 7 ML, no SMOKE signal was detected, which implies existence of magnetic dead layer at room temperature. In the following thickness between 8 ML and 15 ML, both longitudinal and polar Kerr hysteresis loops were observed. In the film thickness larger than 16 ML, only longitudinal MOKE signal without polar signal was detected, which implies existence of in-plane anisotropy in this thickness region.

This work was supported by the Korean Ministry of Science and Technology through the Creative Research Initiatives Project.