Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Spin-polarized metastable-atom deexcitation spectroscopy study of Xenon-adsorbed iron surfaces YASUSHI YAMAUCHI, National Institute for Materials Science, MITSUNORI KURAHASHI, TAKU SUZUKI, PRESTO, Japan Science and Technology Agency, XIA SUN, ZHONGPING WANG — The electron spin polarization at the interface between nonmagnetic and ferromagnetic medias is one of the essential factors that may alter the spin transport phenomena. To investigate fundamental aspects of induced spin polarization we have examined the adsorbate-covered magnetic surfaces by means of spin polarized metastable-atom deexcitation spectroscopy (SPMDS). Use of spin-polarized metastable helium atoms in triplet states moving at thermal energies gives rise to the ultimate surface sensitivity. Although Xenon can adsorb on surfaces at low temperatures by the van der Waals force, no electron exchange with surfaces, especially no spin interaction, is expected because of its closed shell structure. SPMDS spectra measured for Xenon-adsorbed iron surfaces show three prominent peaks that are the same as those previously reported for other surfaces by D. M. Oro, et al. [Phys. Rev. A 49 (1994) 4703]. Two peaks ($^2P_{1/2}$, $^2P_{3/2}$) at higher kinetic energies exhibit clear spin asymmetries while the other low energy peak has no appreciable spin asymmetry. The spin asymmetries will be discussed on the basis of spin polarization and deexcitation processes of metastable atoms.

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Date submitted: 29 Nov 2006 Electronic form version 1.4