

The Effect of Chemisorption on the Magnetic Behavior of
Metastable Layers of fcc Co(001) and Fe(001) (Abstract)

G. Mankey – University of Alabama

et al.

Deposited 07/16/2019

Citation of published version:

Kief, M., Mankey, G., Willis, R. (1990): The Effect of Chemisorption on the Magnetic Behavior of Metastable Layers of fcc Co(001) and Fe(001) (Abstract). *Journal of Applied Physics*, 67(9). DOI: <https://doi.org/10.1063/1.344573>

The effect of chemisorption on the magnetic behavior of metastable layers of fcc Co(001) and Fe(001) (abstract)

Cite as: Journal of Applied Physics **67**, 5416 (1990); <https://doi.org/10.1063/1.344573>
Published Online: 04 June 1998

M. T. Kief, G. J. Mankey, and R. F. Willis



View Online



Export Citation



A horizontal banner for Alluxa. On the left, there is a stylized logo of three overlapping circles in blue, orange, and white. To its right, the word 'Alluxa' is written in a large, white, sans-serif font. Further right, the text 'YOUR OPTICAL COATING PARTNER' is written in a smaller, white, sans-serif font. On the far right, there is an orange arrow pointing to the right, followed by the text 'DOWNLOAD THE LIDAR WHITEPAPER' in a bold, orange, sans-serif font. The background of the banner is a gradient from yellow to blue.

Influence of the island structure on the magnetic properties of quasi-two-dimensional Fe films (abstract)

Z. Q. Qiu, S. H. Mayer, C. J. Gutierrez, H. Tang, and J. C. Walker

Department of Physics and Astronomy, The Johns Hopkins University, Baltimore, Maryland 21218

Reported reductions of Curie temperature and a linear temperature dependence of magnetization in quasi-two-dimensional magnetic films has generated significant interest in the past decade. We have made several Fe(110)/Ag(111) superlattices by molecular-beam epitaxy with the Fe component 2 monolayers thick and the Ag component of various thicknesses. By taking Mössbauer spectroscopy measurement in an external field, we found that a central feature in the Mössbauer spectrum at high temperature may not relate to the reduction of Curie temperature, but instead comes from the thermal relaxation of small islands in the Fe film. The magnetic hyperfine field has a linear temperature dependence, and this is explained by a simple relaxation model based on the island structure. This model is also supported by studying superlattices grown with different conditions.

The effect of chemisorption on the magnetic behavior of metastable layers of fcc Co(001) and Fe(001) (abstract)

M. T. Kief, G. J. Mankey, and R. F. Willis

Department of Physics, Pennsylvania State University, University Park, Pennsylvania 16802

We have investigated the effect of chemisorption on the magnetic properties of metastable layers of fcc Co(001) and fcc Fe(001) epitaxed to Cu(001) substrates. The Curie temperature has been observed to fall rapidly with decreasing film thickness below 10 monolayers,¹ so that the low-temperature chemisorptive properties can be studied. We have observed the binding energies of various adsorbates using thermal desorption kinetics as a function of magnetic film thickness. The magnetic behavior of the films was monitored *in situ* using the surface magneto-optic Kerr effect (SMOKE) method,² and changes in the electronic states at the Fermi level were monitored with high-resolution photoelectron spectroscopy. The question of the basis for a so-called "magnetocatalytic effect"³ is addressed in the light of these results.

Work supported in part by National Science Foundation Grant No. DMR 8818884.

¹J. J. de Miguel, A. Cebollada, J. M. Gallego, S. Ferrer, R. Miranda, C. M. Schneider, P. Bressler, J. Garbe, K. Bethke, and J. Kirschner, *Surf. Sci.* **211/212**, 732 (1989).

²C. Liu, E. R. Moog, and S. D. Bader, *Phys. Rev. Lett.* **60**, 2422 (1988).

³R. S. Mehta, M. S. Dresselhaus, G. Dresselhaus, and H. J. Zeigler, *Phys. Rev. Lett.* **43**, 970 (1979).