

Abstract Submitted
for the SES10 Meeting of
The American Physical Society

Structure and Magnetism of FeAl(110) Surface Phases

MATTHEW PATTERSON, Department of Physics and Astronomy, Louisiana State University, ORHAN KIZILKAYA, CHALLA KUMAR, Center for Advanced Microstructures and Devices, Louisiana State University, RICHARD KURTZ, PHILLIP SPRUNGER, Department of Physics and Astronomy and Center for Advanced Microstructures and Devices, Louisiana State University — We have studied the correlation between FeAl(110) surface structures and surface ferromagnetism using X-ray absorption (XAS), X-ray magnetic circular dichroism (XMCD), and scanning tunneling microscopy (STM). FeAl(110) is cleaned by repeated cycles of Ne⁺ sputtering and annealing and exhibits a variety of surface reconstructions as a function of annealing temperature. Bulk magnetometry shows that single-crystal FeAl is paramagnetic at room temperature. However, it was found by XMCD measurements at the Fe L_{2,3} edge that the surface phase formed by sputtering without annealing exhibits ferromagnetism, and that the small induced magnetization vanishes both with oxidation of the surface and with reconstruction. The observed induced magnetization is discussed in light of STM measurements of the sputtered and oxidized surfaces and prior studies of the morphology of the FeAl(110) surface reconstructions.

Matthew Patterson
Department of Physics and Astronomy, Louisiana State University

Date submitted: 13 Aug 2010

Electronic form version 1.4