

Abstract Submitted  
for the MAR14 Meeting of  
The American Physical Society

**Structure-Property relationship for H covered Fe<sub>3</sub>O<sub>4</sub>(001)**

FANGYANG LIU, Louisiana State University, DIOGO REIS, VON NASCIMENTO, Universidade Federal de Minas Gerais (UFMG), PHILLIP SPRUNGER, RICHARD KURTZ, RONGYING JIN, JIANDI ZHANG, WARD PLUMMER, Louisiana State University — Magnetite(Fe<sub>3</sub>O<sub>4</sub>), the oldest permanent magnet, is still attracting intense studies due to its fascinating surface physical properties. Previous LEED and STM experiments have reported reconstruction on Fe<sub>3</sub>O<sub>4</sub>(001) clean surface, but the origin of this reconstruction is still under debate. Hydrogen removes this reconstruction. LEED, HREELS, XPS are used to study the hydrogen induced surface properties. Surface geometry change was investigated by LEED-I(V) calculation and the structure refinements are being done now. XPS experiments show evidences of OH species on the hydrogen-covered surface, which is consistent with HREELS data, proving H adatoms are bonded to the surface oxygen sites. This suggested the ratio of Fe<sup>2+</sup>/Fe<sup>3+</sup> on the surface is increased. This change is observed by Fe 2p peak shift in XPS spectra. We will discuss the role hydrogen played in the surface structure and physical properties change induced by reconstruction.

Fangyang Liu  
None

Date submitted: 15 Nov 2013

Electronic form version 1.4