Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Structure and magnetic properties of Co doped anatase TiO2 particles HAO ZHU, LUBNA SHAH, YUWEN ZHAO, JOHN Q. XIAO, Physics and Astronomy Department, University of Delaware, MOHAMED A. BARAKAT, G. HAYES, ISMAT SHAH, Materials Science and Engineering Dept, University of Delaware, MOHAMED A. BARAKAT COLLABORATION —
$Co_{0.028}Ti_{0.972}O_{2-\delta}$was synthesized via sol-gel method. It's annealed at 600°C for one hour in air. The X-Rays diffraction study confirmed that samples are of anatase structure and no detectable cobalt clusters or other impurities are observed. The magnetic properties are characterized by SQUID in a broad temperature range 5K $\sim$ 300K, and no ferromagnetic property was observed. The magnetization verse temperature curve fits well with the Curie-Weiss law and the extracted atomic effective moment suggests that the Co(III) is in high spin state. These paramagnetic particles can be turned into ferromagnetic phase with a Curie temperature above 300K after heat treatment in a mixture of H_2 and Ar gases at 600°C for one hour. The origin of ferromagnetism has been studied by XPS, SQUID, XRD and TEM.

Hao Zhu
University of Delaware

Date submitted: 23 Dec 2004 Electronic form version 1.4