Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Using Alkali Ions to Probe the 3D Surface Potential of Cerium Oxide Surfaces GUANGZHI LIU, JORY YARMOFF, Department of Physics, University of California, Riverside, Riverside, CA 92521 USA — Charge exchange between low-energy alkali ions and cerium oxide (CeO_2) single crystal surfaces is shown to depend on the surface local electrostatic potential (LEP). CeO_2 has interesting catalytic properties, and is also a good surrogate for studies of U and Pu oxides. The surface is terminated by oxygen, and the degree of oxidation can be varied by annealing in vacuum or O_2. The final charge state of alkali ions scattered from a metal surface is determined along the exit trajectory by a resonant charge transfer process, which depends on the LEP a few Å's above the scattering site.[1] The neutral fractions of $^{23}Na^+$ ions singly scattered from the Ce sites were measured with time-of-flight. The neutralization decreases for more grazing angles and increases for higher energy, in contrast to the usual expectations. This behavior directly reflects the inhomogeneity in the surface potential, and demonstrates that this technique can provide an experimental measure of the 3D shape of the potential.
[1]C. B. Weare and J. A. Yarmoff, Surf. Sci. 348 (1996) 359.

Jory Yarmoff
Department of Physics, University of California, Riverside
Riverside, CA 92521 USA

Date submitted: 15 Dec 2004 Electronic form version 1.4