

Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Spectromicroscopic characterization of Ag surfaces by energy-filtered LEEM Y. FUJIKAWA, T. SAKURAI, Institute for Materials Research, Tohoku University, R.M. TROMP, IBM Research Division, T.J. Watson Research Center — Low energy electrons have been applied successfully for both structural and spectroscopic studies since the early days of modern surface science. While the reciprocal space analysis has been combined with both microscopic and spectroscopic studies, there is still very limited availability of spectromicroscopic analysis because it is not easy to achieve both high spatial and spectroscopic resolution at low energies. We present spectromicroscopic characterization of Ag islands on Si substrates using a newly developed energy-filtered Low Energy Electron / Photo-Electron Emission Microscope capable of 5D (2D spatial + 2D reciprocal + energy) surface analysis. The electron energy loss signal from Ag surface plasmons (SP) was imaged in real space with a resolution of 35 nm or less, while the SP energy dispersion was obtained from a 6 μm diameter area on Ag(111) within ~ 1 second. HeI photoemission spectra were obtained from a complex Ag island, selecting Ag(111) and Ag(100) areas with a $\phi 4 \mu\text{m}$ aperture during PEEM observation. Full dispersion data covering the full reciprocal-energy space were obtained from both surfaces, reflecting their respective symmetries. The ability to perform detailed spectromicroscopic experiments in a standard lab environment is of key importance for nanoscale analysis of novel structures and materials.

Yasunori Fujikawa
Institute for Materials Research, Tohoku University

Date submitted: 30 Nov 2007

Electronic form version 1.4