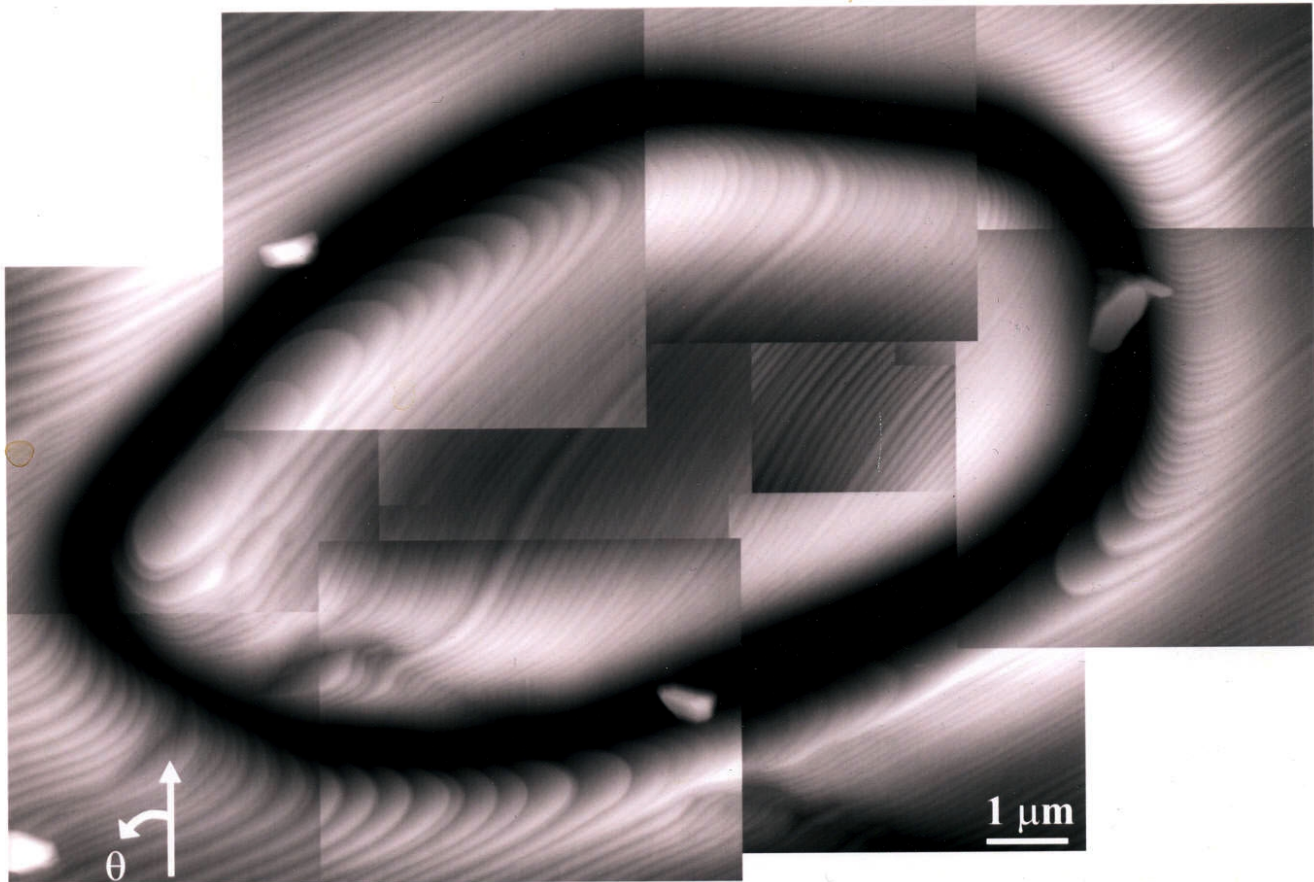
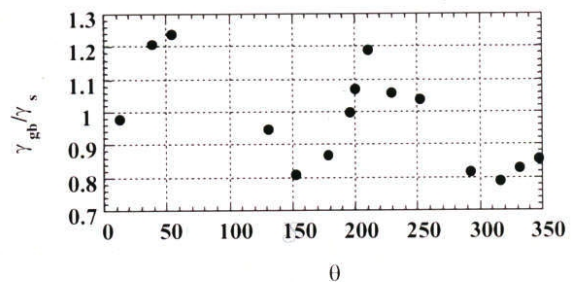


# Circumferential Thermal Groove at a Low Angle Grain Boundary in MgO



The montage of atomic force microscope images above shows a circumferential thermal groove formed on a magnesia surface after thermal etching in air at 1400 °C. The orientations of the inner and outer grain were determined by backscattered electron diffraction; both are near  $\langle 221 \rangle$  and misoriented with respect to one another by a  $5.4^\circ$  rotation about a common  $\langle 310 \rangle$  axis. The grain boundary ( $\gamma_{gb}$ ) to surface energy ( $\gamma_s$ ) ratio was determined from the surface dihedral angle and plotted as a function of position on the groove (right). Anisotropies in the interfacial energies cause the systematic variation in the observed ratio.



David M. Saylor and Gregory S. Rohrer  
Carnegie Mellon University  
Department of Materials Science and Engineering  
Pittsburgh PA 15217-3890

Supported by the MRSEC Program of the NSF under  
DMR-9632556

Classification: Scanning Probe Microscopy