Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Characterization of individual SnO_2 nanowires with surface science techniques KHABIBULAKH KATSIEV, ULRIKE DIEBOLD, Tulane University, ANDREI KOLMAKOV, Southern Illinois University — Tin oxide is widely used as a solid-state gas sensor for detection of combustible and toxic gases. Recently, the use of nanobelts and nanoribbons has been suggested as novel materials for gas sensing applications. Large surface-to-volume ratio of the semiconducting metal oxide nanobelts and the congruence of the carrier screening length with their lateral dimensions make them highly sensitive and efficient transducers of surface chemical processes into electrical signal. The surface morphology of an individual nanobelts (NB) was studied with STM. Atomically resolved STM images of NBs reveal an 1X1 (101) SnO_2 structure on the top surface of the NB. The thermal stability of the NBs was studied with SEM. The critical temperatures were determined, where structural changes occur in UHV, O_2, and air. XPS was used to characterize chemical composition and monitor the cleanness of the NB material. Ca and C contamination was detected on as-grown SnO_2 nanobelts. O plasma, ozone treatment, and annealing in oxygen were used to remove the contaminants.

Khabibulakh Katsiev
Tulane University

Date submitted: 29 Nov 2007 Electronic form version 1.4