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Electrical Properties of Individual Semiconducting Oxide Nanobelt and Their Applications* YI CHENG, P. XIONG, Department of Physics and MARTECH, Florida State University, L. FIELDS, J.P. ZHENG, FAMU/FSU College of Engineering, R. YANG, Z.L. WANG, Georgia Institute of Technology — Field-effect transistors (FETs) with multi-terminal electrical contacts were fabricated on individual oxide (SnO_2 and ZnO) nanobelts. Simultaneous two-terminal and four-terminal measurements enable direct correlation of the FET characteristics with the nature of the contacts. Nanobelt FETs with Schottky contacts were found to exhibit n-channel, p-channel or ambipolar characteristics transistors depending on the properties of the contacts. In contrast, low-resistance ohmic contacts on the nanobelts lead to high-performance n-channel depletion mode FETs with well-defined linear and saturation regimes, "on/off" ratio as high as 10^7 at ambient conditions[1]. The electron concentration and effective carrier mobility of the nanobelts in different gases at various temperatures were determined from FET measurements on the channel-limited devices. Sensitive electrical response of the SnO_2 nanobelt FETs to gas flow containing 0.2-2% H_2 was observed at room temperature[2]. The effort to utilize the channel-limited nanobelt FETs for protein detection will also be reported. *Supported by NSF NIRT grant ECS-0210332. [1]Y. Cheng *et al.*, Appl. Phys. Lett. **89**, 093114 (2006). [2]L.L. Fields *et al.*, Appl. Phys. Lett. **88**, 263102 (2006).

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