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Noise characterization of metal oxide nanowire FETs with electronic properties controlled by surface geometry WENYONG WANG, University of Wyoming, HAO XIONG, CURT RICHTER, NIST, WOONG-KI HONG, TAKHEE LEE, GIST, NANOWIRE COLLABORATION — In this talk we present the results of low-frequency noise and random telegraph signal (RTS) characterization of metal oxide nanowire (NW) field-effect transistors (FETs). ZnO nanowires with different surface geometry properties such as corrugated and smooth surfaces have been synthesized. FETs fabricated from these NWs exhibit different electronic transport characteristics. Noise characterization has been performed on NW FET devices with different surface properties. The obtained noise power spectra at room temperature show 1/f frequency dependences, and the Hooge's constants have been calculated from the gate voltage dependence fo the 1/f noise for the devices with different surface geometries. The characteristics of low frequency noise in the drain current have been further investigated through random telegraph signals measurements at 4.2 K, where the channel current RTSs can be attributed to the correlated carrier number and mobility fluctuation due to the trapping and detrapping of the carriers by discrete border/surface traps. The effects of the NW surface properties on the RTS behaviors will be discussed.

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