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In_2O_3 nanowire based field effect transistor for biological sensors. ZHONGMING ZENG, KAI WANG, WEILIE ZHOU, Advanced Materials Research Institute, University of New Orleans, New Orleans, LA 70148 — Semiconductor nanowires (NWs) are attracting considerable attention due to their nanoscale dimensions and enormous surface-to-volume ratios. Many applications have been demonstrated in toxic gas, protein, small molecule and viruses sensing because of their superior sensing performances. Indium oxide (In_2O_3) NWs have been successfully applied for toxic gas and small organic molecule sensing. In our experiment, In_2O_3 NWs based field effect transistors (FET) are fabricated for virus (Ricin) detections. Single-crystalline In_2O_3 NWs with diameters around 100 nm were synthesized by the thermal evaporation. The nanodevice based on In_2O_3 NWs bridges the source/drain electrodes with a channel length of $\sim$5 μm. Basic transport properties of devices were measured before biological detection. The I-V curves with the gate voltage V_g=0 shows good ohmic contact and the resistance is about 10 MΩ. The back-gate effect on the conductivity showed that In_2O_3 NW is working as n-type channel with obvious back-gate effect, which is much stronger than the reported results. The nanodevices used as virus detection will be also discussed.

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