

Supplement information #S1978

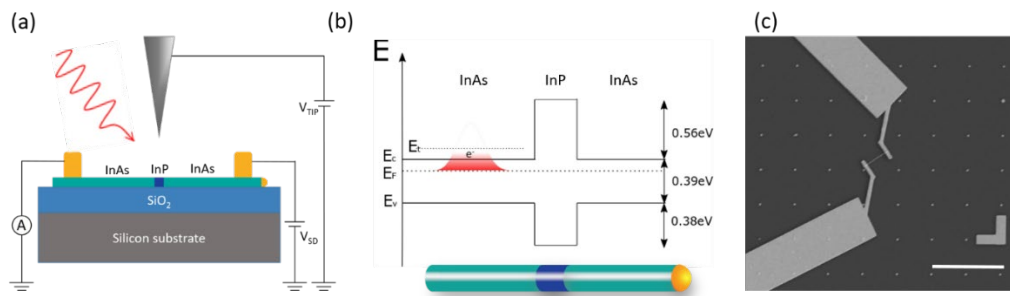


Figure 1. (a) schematic of the combined laser and Scanning Gate Microscopy setup measuring over the device (b) the band diagram of the InAs NW with an InP barrier (c) the SEM image of the InAs/InP barrier NW device. The white scale bar is 5 μm .

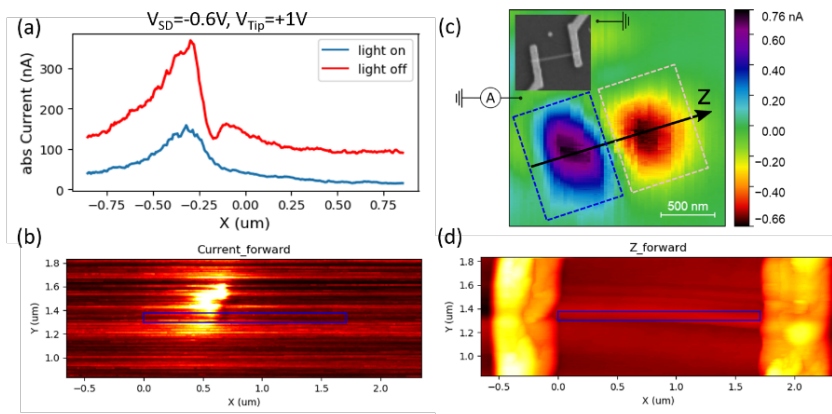


Figure 2. The SGM, SPCM and AFM data from the InAs/InP barrier NW device. (a) SGM current profile over the NW with/without light of $V_{SD}=-0.6\text{V}$, $V_{tip}=+1\text{V}$ (b) SGM map over the scanning area with $V_{SD}=-0.6\text{V}$, $V_{tip}=+1\text{V}$ in dark (c) SPCM data of 785nm laser without external potential over the device. (d) The AFM images obtained simultaneously with the SGM data in (a) and (b).

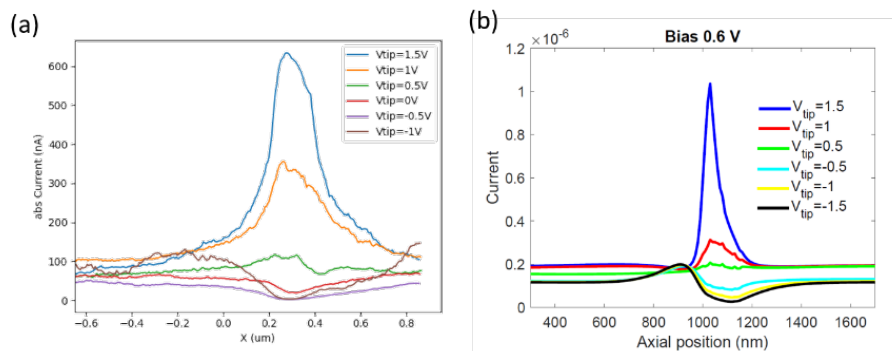


Figure 3. (a) SGM current profiles over the NW device with $V_{SD}=-0.6\text{V}$ and tip bias from -1V to $+1.5\text{V}$ with 0.5V step size. (b) a drift-diffusion equations based Comsol model simulation result of the device under $V_{SD}=0.6\text{V}$ and from -1.5V to $+1.5\text{V}$ with 0.5V step size.