



Figure S1. Current vs. voltage data recorded from (a) an n-type GaN nanowire core, and (b) the outershell of an n-GaN/ $\text{In}_x\text{Ga}_{1-x}\text{N}$ /GaN/p-AlGaN/p-GaN CMS nanowire heterostructure. (c) and (d) The corresponding source-drain current as a function of gate voltage for (a) and (b), respectively, where the source-drain voltages for the core was 1V and for the shell was 10V. The mobilities calculated from these transport data were 500 and $0.5\text{ cm}^2\text{V}^{-1}\text{s}^{-1}$ for the n-type GaN core and p-type GaN shell, respectively.