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Direct growth of carbon nanotubes on $BaTiO_3$ thin films for ferroelectric field effect devices PATRYCJA PARUCH, LASSP, Cornell University, AGHAM-BAYAM POSADAS, CHARLES H. AHN, Yale University, PAUL L. MCEUEN, LASSP, Cornell University — Carbon nanotube field effect transistors have been extensively investigated using a variety of gate dielectrics. We propose instead to use *ferroelectric* (FE) field effect, replacing the dielectric by a thin FE film on a conducting substrate. The remanent FE polarization can provide reversible, locally-controlled, and non-volatile electronic doping of up to $\sim$ 5 x 10^{14} charges/cm^2, over 10 times greater than that available with SiO_2 at breakdown fields. However, many FE materials cannot withstand the high temperatures and reducing atmosphere required for CNT growth. We subjected different perovskite FEs to CNT growth conditions, and from subsequent local and macroscopic measurements of their polarization we have identified $BaTiO_3$ as a good device material. Single walled CNTs grown on $BaTiO_3$ were characterized using the Nb:$SrTiO_3$ substrate as a gate electrode. The effects of FE polarization on the CNT electronic properties are currently being studied.

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