

Abstract Submitted  
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**Measurement of the resistance induced by a single atomic impurity on a (7,6) semiconducting carbon nanotube: scattering strength of individual potassium atoms as a function of gate voltage**<sup>1</sup> RYUICHI TSUCHIKAWA, AMIN AHMADI, DANIEL HELIGMAN, University of Central Florida, ZHENGYI ZHANG, Columbia University, EDUARDO MUCCIOLO, University of Central Florida, JAMES HONE, Columbia University, MASA ISHIGAMI, University of Central Florida — Despite many years of research, no measurements have been performed to determine resistance induced by impurities in carbon nanotubes. Over the last few years, we have developed a capability to measure the resistance induced by a single impurity atom on nanotubes with known chirality. Using this capability, we measured the resistance induced by an individual potassium atom on a (7,6) semiconducting carbon nanotube. The “atomic” resistance of potassium is found to be in the kohm range and has a strong dependence on the applied gate voltage. The scattering strength of the p-type (valence band) channel is approximately 20 times greater than that of the n-type (conduction band) channel. We integrate our atomically-controlled experimental result to a numerical recursive Green’s function technique, which can precisely model the experiment, to understand the measured “atomic” resistance and the asymmetry.

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