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Targeted Damage of Carbon Nanotubes LUKE DONEV, PAUL MCEUEN, Laboratory of Atomic and Solid-State Physics, Cornell University — One possible pathway to fabricating a narrow strip of graphene would be to cut open a carbon nanotube. To that end, we present a preliminary procedure for selectively damaging carbon nanotubes. Nanotubes of diameter 3-10 nm were grown from iron nanoparticles and electrical contacts were lithographically applied to make transistor devices several microns long. To selectively damage the nanotubes a region was opened in a blanket of photoresist over the tube. A thin aluminum oxide layer (2-3 nm) was deposited at an angle in the exposed region to partially protect the nanotube. The nanotubes were then briefly exposed to an oxygen plasma. After the plasma etch and removal of the photoresist and aluminum oxide, a fraction of the nanotubes no longer conduct and others have higher resistance. For some of the nanotubes with increased resistance there is a height difference between the damaged and undamaged sections and scanned gate microscopy shows enhanced sensitivity in the etched region.

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