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STM Investigation of Functionalized Carbon Nanotube Self-Assembly on Gold JUN ZHANG, Rice University, Department of Electrical and Computer Engineering, LEI ZHANG, Rice Univeresity, Department of Chemistry, VALERY KHABASHESKU, Rice Univeresity, Department of Chemistry, ANDREW BARRON, Rice Univeresity, Department of Chemistry, KEVIN KELLY, Rice University, Department of Electrical and Computer Engineering — Self-assembly has proven a powerful technique for patterning and building devices at the nanometer level. Scanning tunneling microscopy (STM) is the ideal tool for probing the chemistry and physics of these types of nanostructures. Building upon on our previous carbon nanotube research, we have investigated thiol- and thiophene-functionalized nanotubes. The motivation is to use these functional groups as a means to self-assemble tubes on surfaces by exploiting the well-established Au-S chemistry. Thiol and thiophene substituted nanotubes were assembled on bare gold surfaces as well as inserted into hexanethiol self-assembled monolayers and imaged by STM. The thiol and thiophene functional groups work as anchors, strongly binding the SWNTs to the gold. Additionally, we have measured the size and spatial distribution of the functional groups along the nanotube sidewalls.

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