Atomically resolved STM images of CVD grown carbon nanotubes

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We have obtained atomically resolved scanning tunneling microscopy (STM) images of chemical vapor deposition (CVD)-grown single-wall carbon nanotubes (CNT) under ambient air and room temperature. The crystal structure of carbon nanotube surfaces has been studied intensively since its chirality (n,m) (or lattice indices) determines the electronic properties of nanotubes. However most studies focus on the CNTs fabricated by laser ablation or electric arc discharge. Most of the high resolution images were captured by STM at either ultra high vacuum or low temperature. In this research, we studied the chirality and diameter of the single-wall CNTs synthesized by CVD because CVD growth methods are highly promising for scale-up of defect-free nanotube materials, and they enable well-aligned CNT growth with better control than is possible with arc-discharge or laser ablation techniques. The preliminary study shows that the diameters of CNTs are in the range of either 1.2nm or 0.8 nm. The chiral angle is about 0 degrees for all nanotubes. The corresponding pair of lattice indices (n,m) are (9,9) or (6,6).