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Study of the Capped End of Carbon Nanotubes by Scanning Tunneling Microscopy

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A capped end of a carbon nanotube(CNT), compared to the cylindrical body, would exhibit unique mechanical structures and localized electronic states, including topological defects such as pentagons. Scanning Tunneling Microscopy (STM) has been proven to be a very powerful tool to study the electronic and structural properties of CNTs. However, because of the difficulty of observing the cap region of horizontally mounted CNTs, most of STM works so far have focused on the seamless cylindrical body. Here we report the direct, atomically resolved STM observation of the cap of CNTs vertically grown out of SiC wafers. Among densely packed, regular shaped cap structures of CNTs, many damaged ones are found. Details of electronic and structural properties of these dome structures will be discussed.