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Electronic Structure of Cs filled Carbon Nanotubes

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With much interest in application of carbon nanotubes (CNT's) to one-dimensional electronic devices, geometrical and electronic structures of various CNT's have drawn much attention. These samples have mainly been studied with low temperature scanning tunneling microscopy and transmission electron microscopy. Scientists have begun to realize that CNT's can be modified locally to produce the electronic, optical or quantum mechanical devices in nanometer scale. Several methods have been tried to modify them locally: 1) Cutting CNT's in a length of ~ 10 nm, 2) insertion of fullerenes into CNT's⁽¹⁾, 3) chemisorption of molecules on the outer wall of CNT's.

We prepared CNT's filled with Cs metals⁽²⁾. The geometric and electronic structures were measured with our home built low temperature tunneling microscope. The local change of the geometric structures and the van Hove singularities were observed near the inserted Cs chains. Cs atoms seem to work as carrier dopants in this geometry. The detailed structures and possible application will be discussed.

[Reference]

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