

Abstract Submitted
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Synthesis and Structure of Carbon Nanotube Junctions and Co_9S_8 Nanowire-filled Carbon Nanotubes¹ WENZHI LI, GAOHUI DU, Florida International University, NANOPHYSICS TEAM — We describe the synthesis of carbon nanotube junctions and Co_9S_8 nanowire-filled carbon nanotubes by pyrolysis of thiophene on cobalt catalyst in chemical vapor decomposition. The formation of these nanostructures is strongly dependent on the thiophene vapor concentration during the material synthesis. The carbon nanotube junctions have hollow channels while the filled carbon nanotubes have solid Co_9S_8 cores. The encapsulated Co_9S_8 nanowires are single crystals, and their lengths are about 10 μm with their [110] direction parallel to the axis of the carbon nanotubes. It is postulated that the filling of the Co_9S_8 nanowires results from the volume increase of the catalyst induced by a phase transition from cobalt to cobalt sulfide and the spatial confinement of the carbon nanotubes as nano-molds.

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Wenzhi Li
Florida International University

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