

142j Assembly of Carbon Tube-in-Tube Nanostructures

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Abstract: Tube-in-tube carbon nanostructures are prepared by reorganization of graphitic impurity nanoparticles outside or inside of the pristine carbon nanotubes. Graphitic impurity nanoparticles were first disintegrated into small graphene fragments by a chemical oxidation with nitric acid, which also modifies the graphene fragments with carboxyl and hydroxyl groups at their edges. The functionalized graphene fragments were then reintegrated outside or inside of pristine carbon nanotubes to construct into tube-in-tube nanostructures. The combination of oxidatively functionalized graphene units, their solvate in a polar organic medium allowing for dispersive forces to effect supramolecular organization with carbon nanotubes acting as templates and their polycondensation by acid-catalysed esterification followed by pyrolysis of the oxygen functionalities lead to complex nanostructures inaccessible by direct synthesis.