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Dopants as Morphology Promoters: a Fundamental Study of the Role of Boron and Sulfur in the Formation of MWNT Junctions
LAKSHMY PULICKAL RAJUKUMAR, ANA LAURA ELIAS, AMBER D. MCCREARY, The Pennsylvania State University, ARAVA LEELA MOHANA REDDY, KAUSHIK KALAGA, Rice University, NESTOR PEREA-LOPEZ, MARTHA E. AUDIFFRED, DAVID SWANSON, The Pennsylvania State University, HUMBERTO R. GUTIERREZ, University of Louisville, ROBERT VAJTAI, PULICKEL M. AJAYAN, Rice University, HUMBERTO TERRONES, MAURICIO TERRONES, The Pennsylvania State University, MURI3D COLLABORATION — We have synthesized CNT-based hierarchical structures via an aerosol assisted CVD process. Our experiments consist of pyrolyzing a solution containing C and Fe sources together with small amounts of B and S sources (800-900C, Ar atmosphere). The resulting structures consist of micron-size fibers decorated with short multi-walled carbon nanotubes that resemble "nanotentacles." The materials have been characterized by SEM, HRTEM, EELS, TGA, XRD, XPS and Raman spectroscopy. Finally, these materials have been tested for its possible application in batteries and supercapacitors.

Ana Laura Elias
The Pennsylvania State University

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