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Synthesis and characterization of dense, vertically-aligned carbon nanotube forests from 10nm colloidal iron oxide nanoparticles DAVID HUTCHISON, BRENDAN TURNER, RICHARD VANFLEET, ROBERT DAVIS, BRIAN WOODFIELD, JULIANA BOERIO-GOATES, Brigham Young University
— We report growth of vertically-aligned carbon nanotubes (VACNTs) on alumina using 10nm iron oxide nanoparticles dried from a colloid. VACNTs were grown by chemical vapor deposition using ethylene, hydrogen and argon, and found to be dense forests with height, number of walls, and density dependent on the catalyst concentration. Comparison between VACNTs produced from nanoparticles and those from more traditional sputtered or evaporated iron films will be made. The forests have been characterized by Raman, TEM, and SEM, and the iron catalyst particles by AFM and TEM. Growth directly from pre-prepared nanoparticles of uniform size offers insight into how the catalyst particles seed carbon nanotube growth and is easier to prepare and faster than iron film deposition by sputtering.

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