

Abstract Submitted
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High Current All-Semiconductor Carbon Nanotube Electronics¹

GUANGYU ZHANG, PENGFEI QI, XINRAN WANG, YUERUI LU, XIAOLIN LI, RYAN TU, SARUNYA BANGSARUNTIP, DAVID MANN, LI ZHANG, HONGJIE DAI, Department of Chemistry, Stanford University, Stanford, CA 94305 — Existence of both metallic and semiconducting carbon nanotubes in as-grown materials has hindered the development of nanotube electronics. A gas-phase plasma hydrocarbonation reaction is shown here to selectively etch and gasify metallic nanotubes, retain semiconducting nanotubes in near-pristine forms without covalent modification, and narrow down diameter distribution of the semiconductors. 100% of purely semiconducting nanotubes are obtained and connected in parallel for high-current transistors without shorts by metallic species. The ‘dry’ chemical approach is scalable and compatible with existing semiconductor processing technology for future integrated circuits.

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