

Abstract Submitted
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Synthesis and metal-to-semiconductor conversion of carbon nanotubes by light irradiation LEWIS GOMEZ DE ARCO, AKSHAY KUMAR, YI ZHANG, KOUNGMIN RYU, ALEXANDER BADMAEV, CHONGWU ZHOU, Electrical Engineering - University of Southern California — We report on the synthesis of aligned nanotubes on Sapphire and quartz substrates, transfer, device fabrication and scalable metal-to-semiconductor conversion of carbon nanotubes on field-effect transistor (CNTFETs) channels by broadband light irradiation at environmental conditions. Inactivation of metallic nanotubes in the channels was achieved as a consequence of a light-assisted photochemical process that led to a controlled sp^2 to sp^3 transition in the nanotubes structure, and hence localization of π -electrons. Stronger gate bias dependence with improvements in the drain current On/Off ratio up to 10^5 was found in around 90 percent of the CNTFETs. The possibility of fabricating mostly semiconducting carbon nanotube transistors by simple light irradiation in air over entire wafers constitutes an important achievement in terms of assembly, integration and large scale fabrication of nanotube-based circuits.

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