

Abstract Submitted
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A study of substrate factor on carbon nanotube forest growth

CARLOS READ, ROBERT CALL, T.C. SHEN, Department of Physics, Utah State University — Carbon Nanotube Forests (CNFs) are vertically grown carbon nanotubes. They can be as tall as millimeters with radii from less than one nm (single-walled) to more than a hundred nm (multi-walled). Their high surface to volume ratio provides a unique material system for EM radiation absorption, dry adhesive and biosensor applications. There have been numerous, but not all consistent reports on successful CNF growth. We find that the optimal growth conditions depend critically on the substrate, at least by the spray pyrolysis method we have adopted. To determine the substrate factor, we have investigated two grades of copper, stainless steel, silicon and quartz as substrates on which the catalytic particles and carbon source are delivered simultaneously by a ferrocene-xylene solution. We find that the interplay of lateral and in-diffusion of the iron atoms and interactions with existing gas molecules such as H₂, O₂, H₂O on the substrates dictate the CNF growth.

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