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Improved Synthesis of Aligned Carbon Nanotube Arrays for Optical Applications TRILOCHAN PAUDEL, YANTAO GAO, YUCHENG LAN, GREGS MACMOHAN, KRZYSZTOF KEMPA, MICHAEL NAUGHTON, ZHIFENG REN, Boston College — Vertically aligned carbon nanotubes were grown on the high temperature glass (Aluminosilicate, Corning 1737) substrates with improved characteristics compared to previous attempts. The glass substrates were first coated with a buffer layer of either Chromium or Titanium, thick enough to facilitate CNT growth, but thin enough as to be largely transparent. On the top of the buffer layer, a monolayer of polystyrene spheres was deposited with close compaction, and then a Nickel catalyst film was evaporated. The polystyrene spheres were then removed to obtain honeycomb Ni patterns. On top of the Ni patterns, vertically aligned carbon nanotubes were grown by the direct current plasma enhanced chemical vapor deposition (dc PECVD). These aligned carbon nanotubes, which can range in height from 0.5 to 10 microns, and in diameter from 50 to 350 nm, can then be coated with various dielectrics to function as components in optical waveguides, including solar cells.

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