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Fabrication of Carbon Nanotube Via Interconnects at Low Temperature and Their Robustness over a High-Density Current

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We fabricated carbon nanotube (CNT) via interconnects (vertical wiring) and evaluated their robustness over a high-density current. Multiwalled carbon nanotubes (MWNTs) were grown at temperatures as low as 365°C using Co catalyst nanoparticles, which were formed and deposited by a custom-designed particle generation and deposition system. MWNTs were successfully grown in via holes with a diameter as small as 40 nm. The resistance of CNT vias with a diameter of 160 nm was found to be of the same order as that of tungsten plugs. The CNT vias were able to sustain a current density as high as 5.0×10^6 A/cm^2 at 105°C for 100 h without any deterioration in their properties.

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