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Abstract

Electron emission from well-aligned, few-walled carbon nanotube arrays was triggered by a low power (< 110 mW), continuous-wave, 650 nm light. Significant electron emission was obtained at low bias voltage. Photo-thermionic emission was found to be the mechanism of emission since the local temperature was measured to be higher than 2000 K, and the emission was consistent with the Richardson Law. A high thermionic emission current of ~ 300 μA was obtained under a low electric field of $0.45\text{V}/\mu\text{m}$. The space-charge-limited emission was observed during the current-voltage testing, which obeyed the Child Law. Under high bias voltage, thermal-assisted field emission was also observed. The emission exhibited high stability ($< 5\%$), fast response (< 1.8 ms), and low emittance ($\sim 2^\circ$).

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