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High performance field emission in hybrid carbon nanotube-PDMS composite CATERINA SOLDANO, Department of Physics, Applied Physics and Astronomy, Rensselaer Polytechnic Institute, Troy, New York, SWASTIK KAR, Department of Materials Science and Engineering, Rensselaer Polytechnic Institute, Troy, New York, YUNG J. JUNG, Northeastern University, Boston MA, SAROJ K. NAYAK, Department of Physics, Applied Physics and Astronomy, Rensselaer Polytechnic Institute, Troy, New York, OMKARAM NALAMASU, PULICKEL M. AJAYAN, Department of Materials Science and Engineering, Rensselaer Polytechnic Institute, Troy, New York — We present a novel method of fabricating flexible carbon nanotube polymer composites by embedding aligned multi-walled carbon nanotube (MWNT) architectures into a polydimethylsiloxane (PDMS) polymer matrix. These structures are easily transferable, electromechanically robust and extremely flexible, and therefore suitable for applications as multifunctional flexible electronic devices. A combination of controlled placement of aligned multi-walled nanotubes on pre-patterned locations and an effective suppression of mutual screening gives these devices impressive field emission properties. With large field emission factors (β $\sim$$10^4$) and low (sub 1V/$\mu$m) turn-on fields, these composites can easily operate at high current densities (>1mA/cm^2) at relatively low voltages making them also suitable for applications in electrically and mechanically stable flexible sensors and display devices.

Caterina Soldano
Department of Physics, Applied Physics and Astronomy
Rensselaer Polytechnic Institute, Troy, New York.

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