

Abstract Submitted
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**DC Anhydrous Electrodeposition
of Carbon Nanotubes** MASAHITO SANO, TAKANORI MATSUMOTO, Yamagata University — Electrodeposition is a versatile technique to fabricate carbon nanotube films on conducting substrates. Due to different responses of metallic and semiconducting nanotubes against electric field in solution, it can be used to discriminate nanotubes based on these types. Depending on whether the applied field is ac or dc, nanotubes are moved across electrodes by either dielectrophoresis or electrophoresis. In ordinary dc electrodeposition, water has been used as a solvent. We have found that, using organic solvents from which water is carefully removed, low dc fields electrodeposit nanotubes quite efficiently [1]. A millimeter thick film can be obtained within a minute with 15V/cm. Furthermore, the process is highly selective; the films are adhered so strongly that it requires scratching the substrate to remove, all nanotubes form thin straight bundles that lie parallel to the substrate, the films show no metallic Raman peaks and have 4 order of magnitude higher resistivity than the original sample [2]. A recent study shows that the electric field is not responsible for adhesion. Other than the first layer that is directly on the substrate surface, the van der Waals force dominates adhesion of nanotubes. [1] Y. Abe, R. Tomuro, M. Sano, *Adv. Mater.* 17, 2192 (2005). [2] R. Tomuro, T. Matsumoto, M. Sano, *Jpn. J. Appl. Phys.* 45, L578 (2006).

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