Structure and morphology of carbon nanotube AFM probes fabricated by dielectrophoresis

JIE TANG, National Institute for Materials Science, Tsukuba, Japan, GUANG YANG, QI ZHANG, Department of Physics and Astronomy, University of North Carolina at Chapel Hill, Chapel Hill, NC 27599, BEN MAYNOR, JIE LIU, Department of Chemistry, Duke University, Durham, NC 27708, LU-CHANG QIN, Department of Physics and Astronomy, University of North Carolina at Chapel Hill, Chapel Hill, NC 27599, OTTO ZHOU, Department of Physics and Astronomy, University of North Carolina at Chapel Hill, Chapel Hill, NC 27599, ZHOU COLLABORATION, QIN COLLABORATION, LIU COLLABORATION — Carbon nanotube probes with diameter of 1~100 nm and large aspect ratios have been demonstrated both theoretically and experimentally that they are quasi-one-dimensional solids with many unique electronic and mechanical properties. We have recently demonstrated the feasibility of fabricating carbon nanotube AFM probes by a solution based dielectrophoresis process. CNT AFM probes can be readily assembled on the apexes of commercial AFM probes with controlled and predetermined length and orientation. In this talk we discuss the effects of the structure and morphology of the cnt AFM probes, the dispersion and stability of the cnt suspension on the quality and reliability of the cnt probes fabricated. The structure and mechanical stability of the probes were also investigated.

Jie Tang
National Institute for Materials Science, Tsukuba, Japan

Date submitted: 08 Dec 2004