Selective Purification of Semiconducting Single Wall Carbon Nanotubes

- STM revealed the effect of hydrogen plasma treatment -

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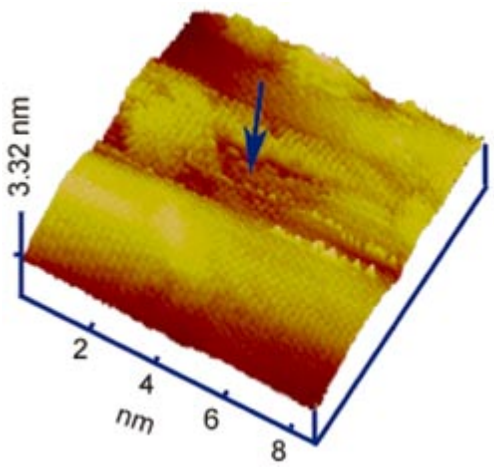
Selective purification of semiconducting single wall carbon nanotubes has been long-awaited key technology. The effect of hydrogen plasma treatment was studied through direct observation using scanning tunneling microscope. We discovered that hydrogen plasma causes serious damages to the metallic carbon nanotubes while leaving semiconducting ones intact. This finding may lead us to a new technology for preferential preparation of semiconudcting single wall carbon nanotubes.



STM image of the surface of metallic carbon nanotubes after hydrogen plasma treatment.
An arrow indicates defects caused by selective etching.

The Fabrication of Microarrays on Fused Silica Plates using the LIBWE Method

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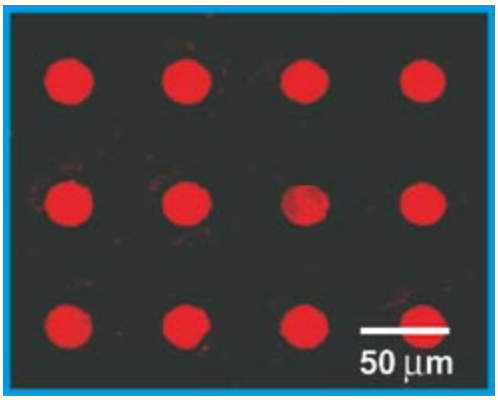
Using laser-induced backside wet etching (LIBWE) technique, microstructures were fabricated onto the surface of fused silica plates, which were pre-coated with self-assembled monolayers (SAMs). Dye molecules, proteins, and polystyrene microbeads were alternately deposited onto the laser-irradiated or nonirradiated areas by either chemical bonding or physical adsorption.

1) J. Wang, H. Niino, A. Yabe, Appl. Phys. A, vol.68, pp.111–113 (1999); JP-Patent: No.3012926.
2) X.Ding, Y.Kawaguchi, T.Sato, A.Narazaki, H.Niino, *Chem. Commun.*, No.17, pp.2168-2169 (2003).



Fluorescence images of a protein layer on the surface of fused silica plates. The inside of the cycles corresponds to the LIBWE-etched cavities.