

## Fabrication of UV Imprint Stamp Using Diamond-Like Carbon Coating Technology

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Diamond-like carbon 코팅기술을 사용한 UV-임프린트 스탬프 제작

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**Key Words:** UV-nanoimprint lithography(UV-나노임프린트 리소그래피), diamond-like carbon(다이아몬드-라이크 카본), two-photon polymerization(양광자 중합반응), focused ion beam lithography (집속이온빔 리소그래피)

**Abstract :** The two-dimensional (2D) and three-dimensional (3D) diamond-like carbon (DLC) stamps for ultraviolet nanoimprint lithography (UV-NIL) were fabricated using two kinds of methods, which were a DLC coating process followed by the focused ion beam (FIB) lithography and the two-photon polymerization (TPP) patterning followed by nano-scale thick DLC coating. We fabricated 70 nm deep lines with a width of 100 nm and 70 nm deep lines with a width of 150 nm on 100 nm thick DLC layers coated on quartz substrates using the FIB lithography. 200 nm wide lines, 3D rings with a diameter of 1.35  $\mu\text{m}$  and a height of 1.97  $\mu\text{m}$ , and a 3D cone with a bottom diameter of 2.88  $\mu\text{m}$  and a height of 1.97  $\mu\text{m}$  were successfully fabricated using the TPP patterning and DLC coating process. The wafers were successfully printed on an UV-NIL using the DLC stamp. We could see the excellent correlation between the dimensions of features of stamp and the corresponding imprinted features.

## 탄소나노튜브의 인장물성 측정

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## Measurement of Tensile Properties for Carbon Nano Tubes

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**Key Words:** Carbon Nano Tube(탄소나노튜브), Manipulator(조작기), Tensile Properties(인장특성)

**Abstract :** Carbon nano tubes (CNT) will be widely used as a novel material in most engineering and medical areas. However in spite of the importance, mechanical strengths have been predicted by theoretical simulation because of measurement difficulties. In this study, in-situ tension test was carried out in scanning emission microscope and then strength characteristics of CNT was evaluated. Two manipulators were manufactured for the tensile test. Multi-wall carbon nano tubes(MWCNT) were produced by electric discharge method and samples for tensile test were selected among the MWCNTs which has superior rectilinearity. The specimens of MWCNT were attached on the end part of cantilever using E-beam and tensile test was carried out in SEM. The tensile properties were evaluated form the test results.