

연꽃잎을 모방한 초발수 표면 제작

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Fabrication of super water repellent surfaces by mimetic lotus leaf

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Key Words: Super water repellent(초발수), lotus leaf(연꽃잎), mimetic(모사)

Abstract : Lotus leaf displays self cleaning effect. Because the contact angle of water is higher than 140o, water droplets roll easily on the lotus leaf. Rolling water droplets sweep off dusts or contaminants on lotus leaf. Self cleaning effects come from hydrophobicity and rough surface. In order to imitate lotus leaf, PTFE(Polytetrafluoroethylene) sputtered in vacuum, CNTs(Carbon Nano Tubes) grown with different densities and replica of AAO(Aluminium Anodic Oxide) template are fabricated. Measured contact angles are 150o, 154o and 135o respectively. These results are analyzed with Wenzel's theory for homogeneous surface and Cassie and Baxters's theory for heterogeneous surface.

마름모형 AFM 캔틸레버를 이용한 고분자 나노섬모의 점착력 측정

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Nano-adhesion test of polymeric nano-hair structure using rhombus-shaped AFM cantilever

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Key Words: AFM (Atomic force microscope, 원자현미경), Rhombus-shaped cantilever (마름모꼴 캔틸레버), Adhesive force (점착력), Nano-hair (나노섬모)

Abstract : In the previous works, a high capacity of rhombus-shaped AFM cantilever manufactured by MEMS technologies has been already proved by performing mechanical bending tests in micro/nano-scale. In this paper, nano-newton scale adhesive force between micro/nano hair structures and silicon tip was measured in AFM system at the atmospheric condition. Nano-hair structure fabricated in anodized aluminum oxide template using PDMS was prepared for the adhesion test. Its diameter is approximately 180 nm and length is 1.2 um. This paper outlines a research process that will encompass: 1) design and fabrication of symmetric rhombus-shaped AFM cantilever, 2) fabrication process of PDMS nano-hairs, 3) adhesion test using the manufactured cantilever and nano-hair structures.