PO1061

Use of conventional plasma etching system for the fabrication of superhydrophobic Si surfaces

Jun-Hyun Kim, Chang-Koo Kim

Ajou university, Suwon, South Korea

kairi0401@ajou.ac.kr

Superhydrophobic surfaces find applications including self-cleaning and anti-fogging surfaces, DNA arrays, microfluidics, and so on. Hydrophobicity of surface has been achieved by manipulating chemical compositions and morphological structures of the surface. Surface coating with hydrophobic materials constitutes a simple and easy means of modifying the chemical composition of the surface. However, this method has limitations to realize superhydrophobic surfaces with contact angles above 150°. Superhydrophobicity can also be achieved through surface nanostructuring, which is used to fabricate one-dimensional (1-D) nanoscale structures, such as nanorods and nanowires, on the surfaces of interest. The fabrication of 1-D nanoscale structures has advantages that the surface can be easily modified. However, it is extremely difficult to control the uniformity of nanoscale structures on a solid surface.
In this work, Si surfaces having microscale rod structures were fabricated in a high density plasma, and their hydrophobicity was investigated. The aspect ratio of the rods were varied in order to analyze the effect of the surface roughness on the contact angle of the surface. Deposition of the fluorocarbon films on the microscale rods was also carried out to investigate the effect of surface energy on the hydrophobicity of the surface. By combining the fabrication of microscale rod structures and the deposition of fluorocarbon films on Si surfaces, a superhydrophobic Si surface with contact angle of 165° was achieved in a plasma etching system.

Keywords
Superhydrophobicity
Plasma etching
Microscale rod
Fluorocarbon film