

Superhydrophobic ZnO nanowire surface: Chemical Modification and Effects of UV irradiation

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We report a facile wet-chemical route for the fabrication of superhydrophobic ZnO nanowire surface modified with fatty acids. A systematic study was performed on the relationship between carbon chain length of fatty acid and wetting states of well-aligned ZnO nanowire arrays. The wettability of the ZnO nanowire array was monotonically converted from hydrophilicity to hydrophobicity by increasing the carbon chain length of the chemisorbed fatty acid. Superhydrophobic surface obtained with stearic acid (SA, C18) showed a maximum water contact angle (CA) of 167°, which decreased gradually under UV illumination, due to UV-enhanced decomposition of SA monolayer. XPS analysis confirmed the photodecomposition of SA molecules through UV irradiation. Also, a selective area UV photo-patterning was demonstrated using a photo-mask on the modified ZnO nanowire array.