

Fabrication of multifunctional superhydrophobic and transparent ZnO nanorod arrays

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Superhydrophobic surfaces bio-mimicking lotus leaves have been attracted by various fields due to its potential applications. In our experiment, superhydrophobic multifunctional surfaces using ZnO nanorod(NR) arrays were fabricated by simple procedures. Firstly, ZnO NR arrays were synthesized on corning glass via a simple hydrothermal method exhibiting superhydrophilicity, high transmittance and antireflection. These properties result from the unique surface structure and material properties of ZnO NR. Highly rough surface due to ZnO NRs enhanced hydrophilicity/hydrophobicity of the surfaces. Also, short length of NRs(about 300nm) made ZnO NRs arrays high transparent. ZnO NR arrays were chemically modified by dipping the sample into 5mM stearic acid/ethanol solution for 3 hours. Then self-assembled monolayers were formed on the surface of ZnO NRs arrays. Finally, the ZnO NRs became superhydrophobic surfaces, whose contact angle reached 159.2° maintaining their properties, such as high transmittance in UV-Vis region, and antireflection. These biomimetic multifunctional ZnO NR arrays can be applied in diverse fields, such as antifogging/self-cleaning surfaces and optical devices.