Fabrication of Superhydrophobic Surface on PTFE/ePTFE Materials by Plasma Etching Process

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Abstract

The PTFE and expanded PTFE (ePTFE) in sheets has been widely used in varied industrial environments based on its hydrophobic surface, elasticity and porous properties. To enhance there applications, sheet PTFE and ePTFE have been modified by various techniques. Most studies concentrated on the improvement of the hydrophilic properties. This study devoted to produce superhydrophobic surface on PTFE and ePTFE materials by RF plasma system using O2 as the reaction gas. The results showed that at a lower RF power (< 300W) can slightly improve the hydrophilic properties due to the occurrence of oxidation and cross-linking reaction. However, the wetting angle was significantly increased to over 160° when the surface modification operated under a higher RF power (> 400W). This can be attributed to the occurrence of the lotus effects, induced by the formation of porous and needle-like structure on PTFE or ePTFE surface after O2 plasma treatment.

Keyword：superhydrophobic, PTFE, plasma etching