Influence of ECR SF6 plasma treatment on polymer surface

Miao Ju Chuang¹, Wan-Jun Chao²

¹AE/ Chienkuo Technology University, Changhua City, Taiwan ²National Chung Hsing University, Taichung, Taiwan

mjchuang@ctu.edu.tw

We demonstrate a simple method to form high hydrophilic/hydrophobic contrast surfaces on polyethersulfone (PES) and poly(methyl methacrylate) (PMMA) samples in just a single processing step using a shadow mask in electron cyclotron resonance generated sulfur hexafluoride (SF₆) plasma atmosphere. The surface properties of plasma-treated polymer films are characterized by contact angle measurement, atomic force microscopy (AFM), and x-ray photoelectron spectroscopy (XPS). The contact angle measurement and XPS analyses clearly indicate that the unmasked areas on the polymer surfaces were hydrophobic with large water contact angle due to surfaces contained a high proportion of the CF₂-CF₂ group and therefore decreased the wettability of the surface. On the other hand, the masked areas on the polymer surfaces contained oxygen-containing groups, resulting in increased wettability of the surface. In addition, the surface wetting property of the masked areas was found to change drastically with the mask-to-substrate distance. The best contract in water contact angle obtained from the treated surfaces was larger than 100 degrees.

Keywords

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