

XPS Studies of Ion Bombarded Polymer Surfaces

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Abstract

Polymeric materials have recently received much attention for their use in microelectronics such as packaging and liquid crystal display industry. Especially, the surface properties of polymers play an important role in many applications. Among various surface modification techniques, ion beam bombardment has been used to study the effect of modification on surface characteristics such as conductivity, optical property, adhesion and friction.

In this work, the surface of polyethylene (PE), polypropylene (PP), polystyrene (PS) and polyimide (PI) was bombarded with 500eV, 50KeV, 100KeV Ar^+ and 50KeV, 100keV N^+ . The ion beam bombarded surfaces have been characterized by X-ray photoelectron spectroscopy (XPS). In addition to the C1s main peak, valence band, X-ray induced Auger electron spectrum and energy loss spectrum in XPS have been also monitored to give a better understanding of the bombarded polymer surfaces. It has been found that the benzene ring components of polymer play an important role in the increase of the valence electron density and in the delocalization process of the excess charge during the ion bombardment. The AFM images revealed that the ion bombarded surface gets smoother than the pristine surface.