[II~7]

# Changes of Wettability and Surface Energy of Polymer by keV $Ar^+$ Ion Irradiation

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$Ar^+$ ion irradiation with various oxygen flow rates was carried out to improve wettability of Polycarbonate(PC) to water and formamide, and change of surface energy by Ar+ ion irradiation with or without oxygen flow was measured. Amount of ion was changed from $5x10^{14}$ to $5x10^{16}$ ion/$cm^2$ in 500 eV to 1.5 keV energy by a broad ion beam source. Wetting angle was 78 degree to 50 degree to water and 69 to 38 to formamide by the $Ar^+$ ion irradiation only at 1 keV energy and dropped to 11 degree at water and to 5 degree at formamide with $Ar^+$ ion irradiation with flowing 4 ml/min. oxygen gas near the polymer surface. In AFM analysis, average root mean square of surface roughness was changed from 14 Å to 22-27 Å by Ar+ ion irradiation, and to 26 - 45 Å by Ar+ ion irradiation with oxygen gas. From this result, wetting angle was not influenced by surface morphology in the experiment. Formation of polar groups on the polymer surface is identified by increase of carbonyl oxygen peak in O1s XPS spectra in the sample treated by Ar+ ion irradiation with oxygen flow. Increase of surface energy of polymer irradiated by $Ar^+$ ion with oxygen flow is mainly attribute to much increment of polar force due to formation of polar group on polymer rather than that of dispersion force.