

[II-13]

Improving Wettability of Polymer Surface(PMMA, PC) and Glass by Ar⁺ Ion Beam Irradiation

Jun-Sik Cho, Won-Kook Choi, Hyung-Jin Jung, and Seok-Keun Koh, Ceramics Division, Korea Institute of Science and Technology, P. O. Box 131, CHEONGRYANG, SEOUL 130-650, KOREA

Ki-Hyun Yoon, Department of Ceramics, Yonsei University, Sudaemoon Ku, Shincheon Dong 131, SEOUL, KOREA

In order to improve wettability of polymer surfaces and glass to triple distilled water, Ar⁺ ions were irradiated on those surfaces under the various oxygen partial pressure. Amounts of Ar⁺ ions were changed from 1×10^{14} to 5×10^{16} ions/cm² at 1 keV energy by Kaufman type ion source.[1] Contact angles of water to PMMA, PC and glass have been measured by Goniotype ERMA-Contact Anglemeter, in which the wetting angle of PMMA was reduced from 68 degree to 49 degree with only Ar⁺ irradiation, and to 8 degree with Ar⁺ irradiation in various oxygen gas flow rate(1 ml/min - 4 ml/min). The wetting angle to PC has been changed from 78 degree to 50 degree with purely Ar⁺ irradiation and to 12 degree with Ar⁺ irradiation and the oxygen environment.[2] In case of glass, it was varied from 36 degree to 26 degree with solely Ar⁺ irradiation and to 13 degree with Ar⁺ irradiation and the oxygen environment. Strong H₂O absorption peaks at around 3500 cm⁻¹ on FT-IR spectra of the polymers (5×10^{16} /cm²: Ar⁺/cm², 4ml/min oxygen gas) are appeared after the surface treatments. Wetting angle recovery was occurred in two opposite conditions such as keeping in dry air environment and in water. The improved wettability are disappeared in dry air environment with exposing time. The minimum contact angles of the polymers are maintained when the polymer are kept in the water for various times. Phenomena correlated with glass are being performed and also other polymers such as PI, PE, and PVDF are being accomplished.

[1] S.K. Koh, W.K. Choi, S.K. Song, H.-J. Jung, and L. Gontcharov(*submitted to J.Vac. Sci. Technol.* 1994. 10).

[2] Applying for U.S. and Korea patents.