

Improving Adhesion of PVDF/Metal Interface Irradiated by few hundreds eV of Ar⁺ ion with Oxygen Gas Flow

S. Han, K. H. Kim, S. C. Choi, K. H. Yoon*,
J. H. Jung, and S. K. Koh

Korea Institute of Science and Technology, Seoul, Korea

*Yonsei University, Seoul, Korea

Ion beam technology has been used in many applications from electronic device to space technology. In material science, highly oriented optical oxide films deposition, epitaxial metal overlayer formation, and polymer surface modification was carried out using the energetic particle. The energetic particle has been applied in substrate cleaning and ion beam etching. In polymer, surface modification by ion beam has been employed to improve crystallinity, mechanical property, surface functionality, etc. The interactions between energetic particles and polymer chain have brought into chain scission, crosslink, carbonization and chemical reaction. However, the low energy ion beam irradiation with reactive gas results in new functional group on the polymer surface. Cold hollow cathode ion source was used for Ar gas ionization, and acceleration energy was changed from 300 to 1000 eV. Base pressure was 5×10^{-6} and working pressure $1.0 \sim 2.4 \times 10^{-4}$ Torr. The contact angle of PVDF to triple distilled water was measured by contact angrometer. Surface morphology was investigated by scanning electron microscopy. X-ray photoelectron spectroscopy was used to analyze the chemical state of PVDF irradiated by the Ar⁺ ion beam. The oxygen gas flow was 0, 4, 6, and 8 sccm.

본 연구는 삼양사와의 이온빔을 이용한 고분자 표면개질 과제의 일환으로 수행되었습니다.