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Surface Modification of Polytetrafluoroethylene(PTFE) by keV ion irradiation in various gas environments

Jun-Sik Cho, Ki Hyun Yoon*, Hyung-Jin Jung, Seok-Keun Koh,

Division of Ceramics, Korea Institute of Science and Technology, P. O.
Box 131, Cheongryang, Seoul, Korea

*Department of Ceramics, Yonsei University

Polytetrafluoroethylene(PTFE) showed a poor adhesion of metal since it was composed of C and F elements and had a low surface energy. In order to increase the surface energy due to formation of hydrophilic groups and adhesion, PTFE was modified by using keV ion irradiation in various gas environments(N_2 , CO_2 , etc.). Ion dose was changed from 1×10^{15} to 1×10^{17} ion/cm² and gas flow rate was 6 ml/min. Ion beam energy of Ar was fixed at 1 keV. Working pressure was 1.5×10^{-4} Torr and base pressure was 1×10^{-5} Torr. The change of chemical state and surface roughness for modified PTFE were identified by XPS and AFM. Contact angle and surface energy of modified PTFE were measured by using contact anglemeter and two polar liquids. The adhesion between Pt and modified PTFE was examined by scotch-tape test. Pt was deposited by ion beam sputtering and thickness of Pt film was 3000 Å.

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