

Abstract Submitted
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Studies on the parameters affecting the adhesion between Diamond-Like Carbon (DLC) films and polyolefin substrates YUUMA NAKAMURA, Department of Mechanical Engineering, Keio University, Japan, TERUMITSU HASEBE, Department of Radiology, Tachikawa Hospital, Japan, AKI KAMIJO, KOUKI TAKAHASHI, Department of Transfusion Medicine, University of Tokyo Hospital, Japan, TETSUYA SUZUKI, ATSUSHI HOTTA, Department of Mechanical Engineering, Keio University, Japan — Polyolefins coated with thin Diamond-Like Carbon (DLC) films are particularly attractive for effective control of the surface and mechanical properties of the polyolefins and the adhesion between the DLC and the polyolefins determines the major properties: if the adhesion force is not sufficient, DLC film is easily peeled off from the polyolefin substrate, eventually degrading the whole highly-controlled DLC-polyolefin system. In this work, we evaluated the adhesion between DLC films and various polyolefin substrates through T-peel testing using tensile tester. DLC films were deposited on each polyolefin substrate by plasma enhanced chemical vapor deposition (CVD) method using acetylene gas. High-density polyethylene (HDPE), low-density polyethylene (LDPE), linear-low-density polyethylene (LLDPE), isotactic polypropylene (iPP) and syndiotactic polypropylene (sPP) were introduced as polyolefin materials. It was found that molecular structures and annealing conditions had significant effects on the adhesion between DLC and the polyolefins.

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