〈技術資料〉

側鎖結晶性ブロック共重合体による難改質性高分子表面の機能化

Functionalization of Hard-to-Modify Polymer Surfaces with Side Chain Crystalline Block Copolymers

八尾　滋

Abstract

Polyethylene and polypropylene are the most commonly used plastics. On the other hand, these plastics are known to be non-adhesive and it is very difficult to change their surface properties. For these plastics, physical methods such as plasma are used to modify their surface properties, however, many problems have been pointed out, such as, special equipment are required, extremely difficult to modify in shadowed areas and pores, and the modified properties disappear with passing time.

In this study, we focused on the van der Waals interaction, which has not paid much attention as the interaction force of adsorption, and the crystallization force that organizes macromolecules. According to the upper consideration, we synthesized side chain crystalline block copolymer with having a long alkane side chain and investigated the surface adsorption ability and the surface modification effect of the above-mentioned hard-to-modify polymer. As a result, we found that not only polyethylene but also polypropylene and PET can be chemically modified by immersing them in the copolymer dilute solvent. This discovery is significant in that it has found the possibility of developing these plastics into fields that were previously thought to be impossible to apply.

キーワード：側鎖結晶性ブロック共重合体、ファンデルワールス力、結晶化力、表面改質、難改質性高分子

Keywords：Side Chain Crystalline Block Copolymer, van der Waals interaction, Crystalline force, Surface modification, Hard-to-modify polymer

1.　はじめに

プラスチック産業は木材・金属・ガラスなどと比較して1950年代から始まった新興素材産業であるが、急速に成長し、現在では全世界で年間約4億トンも生産され、体積では鉄鋼をはるかに凌駕する基幹産業に成長した。この主な原因としては、安価で軽量であること、そして加工性がよく、非常に薄いフィルムなども容易に作製できることなどが挙げられ、まさに人類が待ち望んでいた素材ということができる。また化学構造をわずかに変えるだけで、耐熱性や弾性率などをコントロールできるため、多種多

2022年9月17日受付
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