

Functionalization of Polypropylene with Chiral Monomer for Improving Hemocompatibility

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Abstract : Polypropylene (PP) is one of the most commonly used plastics because of its low density, outstanding mechanical properties, and low cost. However, its drawbacks such as low surface energy, poor dyeability, lack of chemical functionalities, and poor compatibility with polar polymers and inorganic materials, have restricted the application of PP. To expand its application in biomedical materials, functionalization is considered to be the most effective way. In this study, PP was functionalized with a chiral monomer, (*S*)-1-acryloylpyrrolidine-2-carboxylic acid ((*S*)-APCA), by free-radical grafting in the solid phase. The grafting degree of PP-g-APCA was determined by chemical titration method, and the chemical structure of functionalized PP was characterized by FTIR spectroscopy, which confirmed that the chiral monomer (*S*)-APCA was successfully grafted onto PP. Static water contact angle results suggested that the surface hydrophilicity of PP was significantly improved by solid phase grafting and assistance of surface water treatment. Protein adsorption and platelet adhesion results showed that hemocompatibility of PP was greatly improved by grafting the chiral monomer.

Keywords : functionalization, polypropylene, chiral monomer, hemocompatibility

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