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Description

Encyclopedia of Materials: Plastics and Polymers, Four Volume Set covers plastics and polymeric materials, including their fundamental properties, current and potential future application areas in various private, public, commercial and industrial sectors, and their biodegradability, reusability and disposability. As well as covering all aspects of the science and applications of plastics and polymers, the book expounds on newer developments, including up-to-date articles and knowledge. In addition, the detrimental environmental effects of plastics and

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Rheological Behaviors of Ultra High Molecular Weight Polyethylene (UHMWPE)

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Abstract

Ultra-High Molecular Weight Polyethelene (UHMWPE) is a polymer which is used in different areas like packaging, machinery, bio-implants, bullet proof body armor, due to its high strength to weight ratio, wear and abrasion resistant properties, chemical stability, insulation property etc. It has very long molecular chain with distinct two phases, crystalline and amorphous. Polymer solution of UHMWPE composed of homogeneous entanglement network and its flow behavior, viscosity, storage modulus (G'), loss modulus (G'') are effected by change of temperature, frequency and solution concentration. Due to very high viscosity UHMWPE has poor processability. Polyethelene glycol (PEG) is used as a processing aid and hydroxyapatite (HA) as reinforcement material to increase processability. Crystallinity of UHMWPE can be increased by using Zinc Oxide particle, Carbon Nano Tube (CNT) and in irradiation process. In irradiation process, generated free radicals start reaction such as hydrogen abstraction, hydroperoxide formation, chain scission, reduction in molecular weight and oxidation. To avoid the reaction started by free radicals, by subsequent below-melt annealing or remelting steps are followed to reduce free radicals and degree of oxidation. Vitamin E can be used as an antioxidant which impends the reactions of free radicals to react with oxygen presence in UHMWPE structure.

Keywords

Carbon Nano Tube(CNT); Crosslinking; Crystallinity; Decalin; Degradation; Entanglement; High density polyethylene (HDPE); Low Density Polyethylene (LDPE); Loss modulus (G''); Paraffin; Polyethelene (PE); Polyethylene glycol (PEG); Shear rate; Storage modulus(G'); Ultra-High Molecular Weight Polyethelene (UHMWPE); Viscosity

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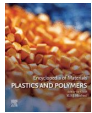


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FEEDBACK

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