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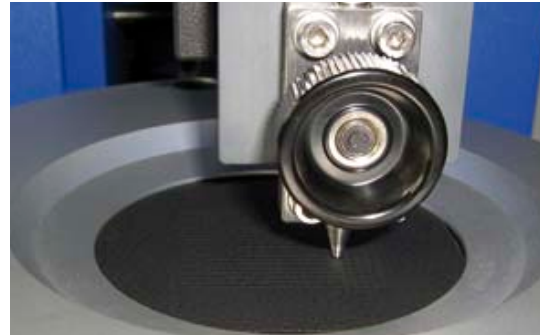
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J. NEUER, G. BERGER

TPE-S compounds for scratch-resistant surfaces 214

Combining the elasticity of rubber and the processability of plastics – thermoplastic elastomers (TPEs) bring together the flexible properties of elastomers and the processing opportunities of thermoplastics, closing the gap between these two material groups. Until now, TPE offered poor scratch resistance and the material was therefore only used for few automotive parts. Experts at Kraiburg TPE are currently developing new TPE-S compounds suitable for a wider range of applications where a high scratch resistance is required.



H. HASENMAIER, W. SIEWERT, M. BASTIAN, P. HEIDEMEYER, B. ULMER, M. GEHRINGER

Extruded multi-layer flame retardant fire hoses 216







In 2005 two fire fighters were killed during a fire fighting operation in Tübingen in Southern Germany. They were an advance team, who had entered into a burning warehouse with breathing apparatus and a water hose to get to the source of the fire. A burst in the hose cut off their water supply. Flames blocked their way back [1]. Such tragic accidents occur again and again. Most high pressure fire hoses in use survive only a maximum time of 10 s before bursting, if the tube comes into contact with burning material or embers [2]. The goal of a research project funded by the Federal Economics and Technology Ministry (BMWi) as part of its "Central SME Innovation Programme" entitled "Extruded multi-layer flame retardant fire hoses" is to make the hoses more resistant.



C. SU, A. LIN

Ultra-high MW SEBS for high performance applications 220

SEBS (Styrene-ethylene-butylene-styrene) block copolymer is a second generation thermoplastic elastomer (TPE). It can be compounded to meet particular needs by balancing its physical property performance and ease of process. Typical SEBS compounding ingredients are those commonly encountered in rubber and plastics compounds. These ingredients include resins, plasticizers, thermal stabilizers, UV stabilizers, fillers, flame retardants, and pigments. Ultra-high molecular weight SEBS Taipol 6159 can improve the tensile strength and give permanent compression deformation similar to that of TPV material. It uses low viscosity processing oil to get good physical properties and compression sets. Further cross-linking with peroxide allows Taipol 6159 to be used in higher service temperature (~120 °C) applications.

PS	EB	PS		MW ratio
			Taipol 6151	1.0
			Taipol 6159	1.50 – 1.55

Good grip for medical devices 223

J. G. DROBNY, J. E. PUSKAS, M. LUEBBERS

Novel polyisobutylene-based thermoplastic elastomers in medical applications 224

The required properties of any material used for replacement or repair of various organs and other parts of a body (referred to as a biomaterial) are in general biocompatibility, sterilizability, adequate physical and mechanical properties as well as a good processability for the ease of manufacture. Biocompatibility is defined as the ability of a material to perform with an appropriate host response in a specific application. For a satisfactory function, the material must resist the biodegradation in the body that generally involves various combinations of oxidative, acidic, hydrolytic and enzymatic processes. Polymers have been used in such applications for a long time with relatively good results. Polymeric materials with well-established performance as biomaterials are polyesters, fluoropolymers, polypropylene, polyurethanes and silicones. Recent developments in polymer synthesis have produced polymers with exceptional properties as biomaterials. These novel polyisobutylene-based thermoplastic elastomers were developed as prospective implant materials mainly for soft tissue replacement and reconstruction. This review covers mainly their already well established applications as well as those, which are under development.

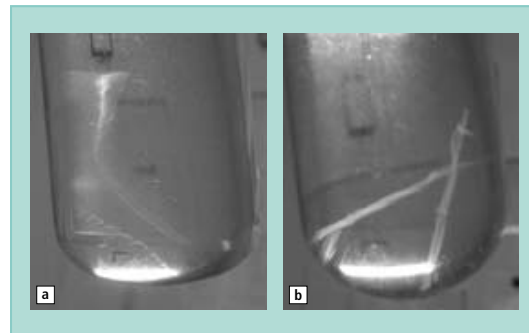


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S. DATTA, R. R. BABU, Y. K. BHARDWAJ, S. SABHARWAL, K. NASKAR

Optimization of mechanical properties of photocrosslinked styrene butadiene styrene block copolymers using statistical experimental design 232

Ultra violet (UV) crosslinking technology was applied to crosslink SBS thermoplastic elastomers. Statistical trend analyses were used to optimize the physical properties of UV-crosslinked styrene butadiene styrene (SBS) block copolymers. D-optimal design was selected to analyse the interaction between the independent (factors affecting the properties) and dependent variables (responses to the properties). Irradiation time and height were treated as continuous factors whereas photoinitiator (PI) concentration and vinyl content of SBS block copolymers were treated as categorical factors. Analyses of variance (ANOVA) and response surface methodology (RSM) were employed to model and analyse the mechanical properties observed. Primary results showed that low PI concentration (1 wt.-%) and high vinyl content gave significant improvement in the mechanical properties. Variations of individual properties were also analyzed and graphically visualized by RSM. Numerical and graphical optimization showed that, 1 wt.-% of PI concentration on 35 s treatment time and 15 cm packing height give best overall balance of properties. In other words, closer distance to the UV lamp and lesser irradiation were best to give the overall balance of physical properties. Surface morphology and tensile fractography were performed to understand the nature and mode of surface damage and failure respectively.



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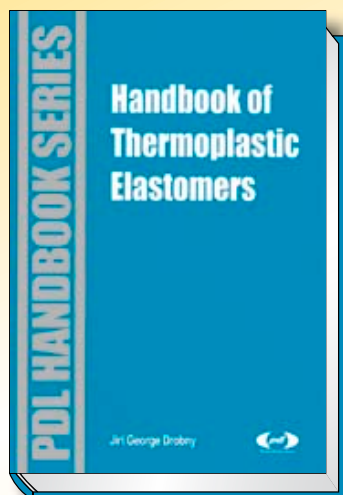
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ALL ABOUT THERMOPLASTIC ELASTOMERS



Thermoplastic elastomers are one of the most in-demand groups of materials today. Their most attractive feature is that they can be processed like plastics, yet they exhibit properties that are close to vulcanised rubber. Consequently, they can be produced in a highly cost-effective way, using short production cycles, with a considerably reduced energy consumption, and minimum production scrap. Moreover, because they are thermoplastics, production scrap as well as post-consumer scrap can be easily recycled.

This unique practical reference work compiles in one place the current working knowledge of chemistry, processing, physical and mechanical properties, as well as applications of thermoplastic elastomers. Because of the great number of thermoplastic elastomers and the variety of chemistries involved, the work is divided into chapters describing individual commercial groups. A significant part of this book is dedicated to processing methods, applications, and material data sheets. Chapters on processing methods and applications are enhanced with ample illustrations. Each chapter includes a comprehensive list of references for a more in-depth study. Other features are a list of current suppliers, ISO nomenclature, an extensive bibliography, a list of recent patents and a glossary of terms. The work is concluded by a chapter on newest developments and trends.

Jiri George Drobny

Handbook of Thermoplastic Elastomers

William Andrew Publishing, 2007, 404 pages, hardcover, ISBN 978-0-8155-1549-4
EUR 225.00