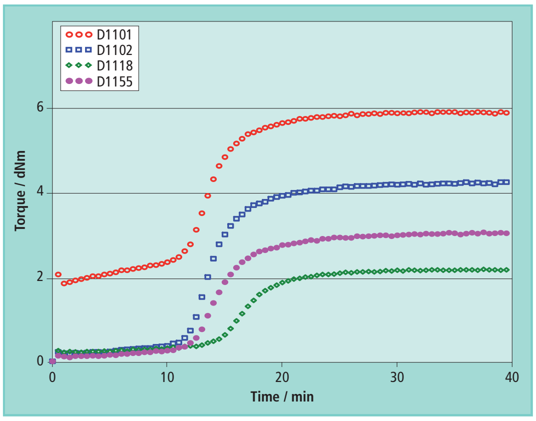
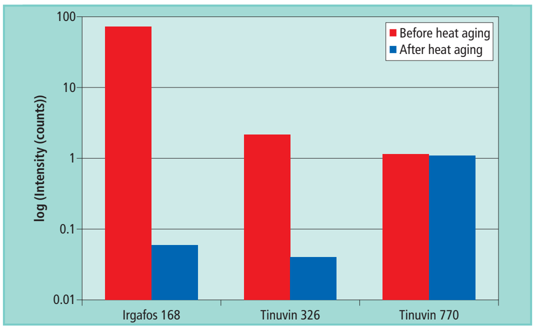
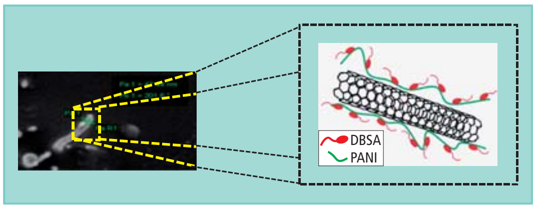
Novel thermoplastic hybrid elastomers were investigated in this study. The compounds based on four different types of styrene butadiene styrene triblock copolymers (SBC) were covalently crosslinked by means of a sulphur/accelerator system. Thus, in contrast to customary SBS compounds, the network structure of the novel material contains physical as well as chemical crosslinks, formed by styrene hard domains and sulphur bridges, respectively. The material properties were investigated by means of standard test methods, e. g. tensile tests and compression set. Additionally, temperature scanning stress relaxation measurements were performed to determine the degree of crosslinking. It was found that crosslinking of the polybutadiene soft phase results in a remarkable improvement of the mechanical properties, in particular with respect to compression set and stress relaxation at high temperature.



For the stabilization of SEBS compounds in outdoor applications the combination of phenolic antioxidants with phosphite co-stabilizers and hindered amines is often recommended. Excess of stabilizers leads to undesired blooming, whilst too low amounts can cause discoloration and/or loss of mechanical properties. Pyrolysis GC-MS, as an ideal tool for the quantification of stabilizers, is used to determine the consumption of stabilizers of SEBS compounds during the molding process and in accelerated aging.



The present work describes a facile and rapid route of conductive nanocomposites production. A novel fabrication method of elastomeric conductive systems containing nano-particles, carbon nanotubes (CNT) and polyaniline (PANI).The new synthesis procedure includes an in-situ inverse emulsion polymerization method of aniline doped with dodecylbenzene sulfonic acid (DBSA) in the presence of CNT and dissolved styrene-isoprene-styrene (SIS) block copolymer, followed by a precipitation-filtration step. Incorporation of CNT/PANI in the SIS elastomeric matrix improves the mechanical and the electrical properties of the nanocomposites. Formation of the continuous three-dimensional CNT/PANI network, is responsible for enhancement of the resulting nanocomposite properties. The described novel approach provides an opportunity for developing tunable structures of remarkably distinctive architecture.



In this work, different amines (bifunctional, as diazabicyclo[2.2.2]octane (Dabco) and monofunctional, as N-methylimidazole or trimethylamine) were utilized for the amination of benzyl chloride-grafted polystyrene-b-poly(butadiene)-b-polystyrene triblock copolymers (SBS-g-VBC). The use of Dabco solutions in mixture with variable amounts of monoamine or at different concentration allowed to modulate the degree of crosslinking of the SBS-based membranes and their electrochemical parameters. More specifically, tuning Dabco concentration permitted the reduction of water uptake without significantly affecting ionic conductivity.