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DETERMINATION OF GLASS TRANSITION TEMPERATURE AND IRRADIATION RESISTANCE OF ELASTOMERIC MATERIALS BASED ON CHLORINATED NATURAL RUBBER

Jaroslava Budinski-Simendić[1], Milena Marinović-Cincović[2], Dejan Kojić[1], Gordana Marković[3], Jelena Pavličević[1], Ayse Aroguz[4], Suzana Samaržija-Jovanović[5]

1 Unuversity of Novi Sad, Faculty of Technology, Novi Sad, Serbia
2 University of Belgrade, Vinča Institute of Nuclear Sciences, Belgrade, Serbia
3 Tigar A.D., Pirot, Serbia
4 Istanbul University, Chemistry Department, Istanbul, Turkey
5 University of Priština, Faculty of Natural Science and Mathematics, Kosovska Mitrovica, Serbia

Synthetic rubbers have different surface structures but benefit from chlorination. In many cases their tensile strength and extensibility is lower than natural rubber and for that reason more easily mechanically damaged. Chlorination reduces the coefficient of surface friction and handling characteristics. Residual free sulfur bloom during long-term storage of elastomeric products can also be diminished. Chlorinated natural rubber (CNR) as network precursor for elastomeric materials finds application in paints, paper coatings, printing inks, adhesives, and textile finishes. An alternative way to reduce surface tackiness of powder-free latex NR medical gloves is the chlorination of the gripping side or the use of coating which may be silicone polymer, hydrogel, polymer blend or acrylic polyurethanes. Chlorination affects some of the beneficial characteristics of rubber latex, but also eliminates soluble proteins that promote allergic reactions. Chlorinated rubber has been used for restoring and excellent protecting plaster, concrete, and pool surfaces. It is a good choice for recoating previously painted surfaces. Focus of our work was to prepare elastomeric materials based on CNR and its blends with different content of chlorosulfonated polyethylene (CSM) filled with 50 phr of recycled elastomer powder (REP). The glass transition (Tg) represents the temperature above which a polymer changes from a stiff glass into a viscous fluid or a rubbery material and was evaluated using dynamic-mechanical spectroscopy. It was estimated that that the polar groups at network precursors influenced the shift of the Tg values. The effect of irradiation dose on retained hardness and tensile strength of CNR/CSM/REP elastomeric composites was determined.

THE INFLUENCE OF CARBON BLACK ON THERMAL DEGRADATION AND GAMMA IRRADIATION RESISTANCE OF ELASTOMERIC COMPOSITES BASED ON THREE NETWORK PRECURSORS

Slaviša Jovanović[1], Gordana Marković[2], Milena Marinović-Cincović[3], Vojislav Jovanović[4], Dejan Kojić[5], Ljiljana Korugić-Karasz[6], Jaroslava Budinski-Simendic[5]

1 Mitas d.o.o., Ruma, Serbia
2 Tigar AD, Pirot, Serbia
3 University of Belgrade, Vinča Institute of Nuclear Sciences, Belgrade, Serbia
4 University of Priština, Faculty of Natural Science and Mathematics, Kosovska Mitrovica, Serbia
5 University of Novi Sad, Faculty of Technology, Novi Sad, Serbia
6 University of Massachusetts, Amherst, United States

The tire is an assembly of more components that are built up on a drum layer by layer and then crosslinked in a press under heat and pressure. Multi-component elastomeric materials are using for its production. The formation of polymer network creates the elasticity that permits the tire to be compressed in the area where the tire contacts the road and return back to its shape under high-frequency deformations. Some special application is for slick tires that provides more traction than grooved tires due to their greater contact area. Wet roads severely diminish the traction due to the water trapped between the contact zone and the road surface (aquaplaning). Polyisoprene (NR) is the basic network precursor used in tire fabrication. Polybutadiene (BR) is used in combination with other rubbers because of its low heat-buildup properties. The copolymer of styrene and butadiene (SBR) is often substituted in part for NR due to the comparative raw cost. The filler carbon black (CB) forms a high percentage in rubber compounds. After crosslinking this nanoparticles influence reinforcement and abrasion resistance. In elastomeric materials based on ternary blends characteristics of individual rubbers can significantly changing due to the intermolecular interactions. Focus of this work was to evaluate the irradiation resistance and thermal stability of composites based on different content of carbon black and three network precursors (BR/SBR/NR) with its mass ratio 25/50/25. The compounds were crosslinked by sulfur in hydraulic press and obtained materials were exposed to gamma irradiation at different doses up to 400 kGy. Thermogravimetric analysis confirmed that thermal stability of composites was increased with the CB content increase. The mechanical properties were determined before and after gamma irradiation of samples. It was assessed that the mechanical properties increases with increasing the irradiation dose up to 200 kGy and CB content up to 60 phr. The morphology of prepared materials was studied using scanning electron microscopy.

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