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BOOK OF ABSTRACTS

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

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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 used 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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