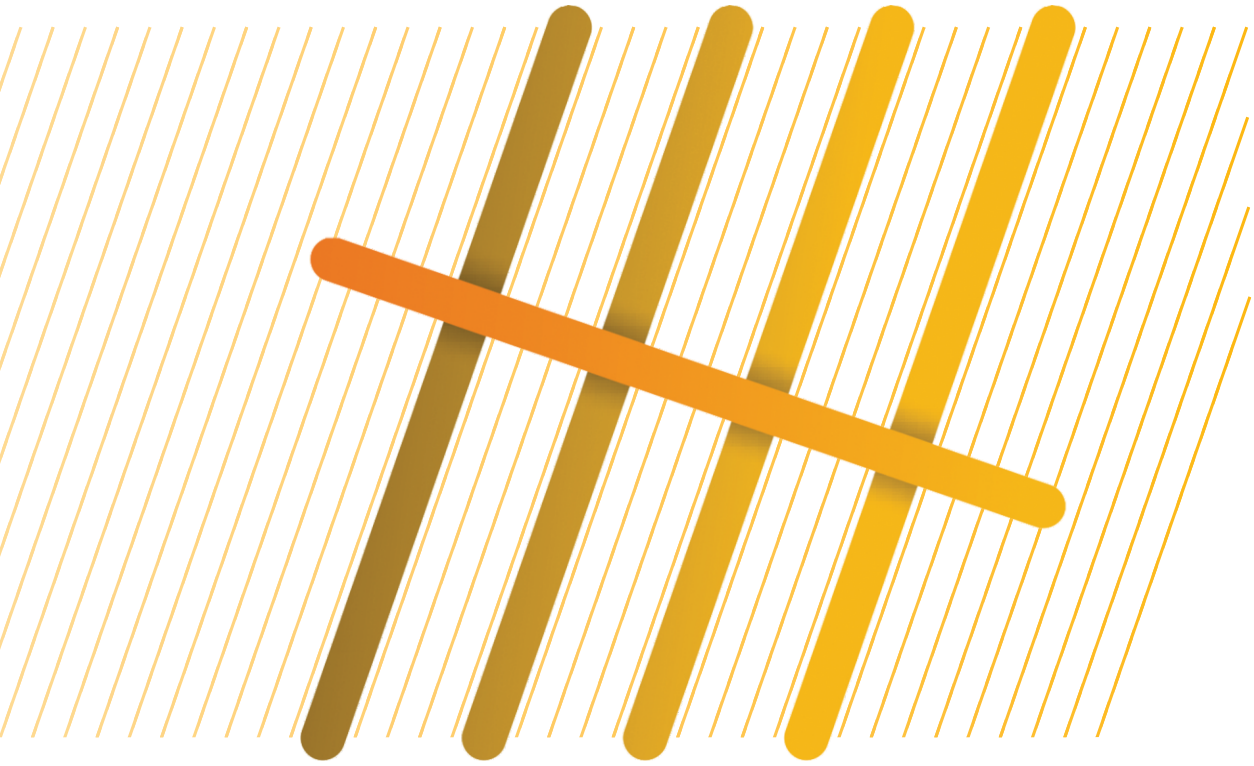

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BOOK OF ABSTRACTS

THERMAL DEGRADATION OF GAMMA IRRADIATED ELASTOMERS BASED ON DIFFERENT NETWORK PRECURSORS

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In rubber industry fillers are used to enhance specific properties of elastomeric materials based on different nano particles have gained attention due to their ability to improve the properties and irradiation resistance. The uniform filler distribution in the cross-linked material is desired. It is a challenge to create a favorable interaction between different network precursors, and thus avoid agglomeration of the nano particles. The main focus of this work was to investigate thermal degradation of carbon black reinforced elastomers based on two network precursors: chlorinated copolymer of isobutylene and isoprene (CIIR) and chlorosulphonated polyethylene (CSM). Both used rubbers are categorized as predominantly irradiation cross-linkable types. It is well known that materials based on CIIR have very good properties including the compression set, good adhesion, the compatibility to other rubbers, good thermal and oxidative stability, excellent moisture resistance, and low gas permeability. It has been used for inner tubes, hoses, tank linings, friction pads, pharmaceutical stoppers, tyres, and conveyor belts. Elastomeric materials based on CSM are using in many applications such as sheeting cable and membrane, cable jacketing, flexible magnets due to its outstanding resistance to degradation by the heat, ozone and oxidation. Properly formulated CSM compounds offer strong adhesion to various substrates and good dynamic properties. The curing of rubber blends was carried out in an electrically heated laboratory hydraulic press. The size of carbon black primary particles was 40–48 nm. The samples CIIR/CSM (50/50 mass %) were irradiated in air at ambient conditions using 100, 200 and 400 kGy doses by the Co-60 irradiation unit. Thermal stability of materials was assessed by thermogravimetry (TGA). The sample mass losses (0.5; 10; 30 %) were calculated for the respective TGA curves. Radiation-initiated reactions can be classified as: (a) scission and (b) cross-linking. Cross-linking during irradiation does not require unsaturated or other more reactive groups, and the mechanism generally varies with the network precursor concerned. The preliminary observation in this work leads to conclude that stability of prepared elastomeric nano-composites increases with irradiation up to 200 kGy dose after that it decreases. The results show positive synergistic influence of gamma irradiation and carbon black particles on the thermal stability of composites. Obtained materials may be suitable for industrial applications requiring elastomers of good thermal stability and radiation resistance.

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