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Article · December 2018

DOI: 10.21608/ejchem.2018.5763.1495

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Articles in Press, Accepted Manuscript , Available Online from 10 December 2018 XML
Document Type: Original Article
DOI: 10.21608/ejchem.2018.5763.1495

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Receive Date: 20 October 2018, Revise Date: 19 November 2018, Accept Date: 10 December 2018

Abstract

Blends composed of styrene butadiene rubber (SBR) and acrylonitrile-butadiene rubber (NBR) have been fabricated by melt-blending technique using two-roll mill blend machine. Cis-polybutadiene rubber (CBR) was used as a compatibilizer for enhancing the homogeneity between blend phases. No previous reports were found to discuss improving electrical properties of vulcanized SBR/NBR blends using unfilled rubber system (i.e. no fillers incorporation). SEM micrographs were utilized to verify the compatibility between two rubber ingredients in various blends, owing to the use of compatibilizer. Thermal stability of blends was investigated by differential thermal analysis (DTA) and differential scanning calorimetric (DSC) to evaluate the influence of blend ratio on the compatibility of investigated samples. Results revealed that the dielectric properties of blends are dramatically influenced by altering the blend ratio. The results revealed that the SEM observations confirmed the compatibilization effect of CBR on vulcanized SBR/NBR blends. Meanwhile, thermal properties of vulcanized SBR/NBR blends were enhanced with increasing of SBR contents in blends. The complex impedance graphs showed circular arcs showing the bulk contribution to overall electrical behavior for investigated vulcanized SBR/NBR blends. During I-V characteristics have been presented, where a remarkably change from linear behavior to nonlinear conduction at lower temperatures was found for 0SBR/100NBR blends. These findings supported and confirmed that the compatibilization effect and the blend ratio between rubber compositions have strongly influenced on their thermal and electrical properties of vulcanized blends.

Keywords

SBR/NBR blends, CBR Compatibilizer, Thermal properties; Impedance spectroscopy; Electrical characteristics

Main Subjects

Polymer chemistry