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**Ionic liquid functionalised reduced graphene oxide fluoroelastomer nanocomposites
with enhanced mechanical, dielectric and viscoelastic properties**

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ABSTRACT

Utilization of Ionic Liquids (IL) as suitable candidate for nanofiller modification is of considerable interest in the current scenario owing to its peculiar properties. In the present study reduced graphene oxide (rGO) is modified with varying amount of IL to improve the dispersability and interaction with fluoroelastomer (FKM) matrix. The surface modification of rGO using IL, its dispersion and incorporation into the FKM matrix was confirmed by FTIR, Raman, XRD, and AFM surface roughness analysis. The prepared nanocomposites achieved better static and dynamic mechanical properties by the addition of 2 phr of IL to rGO. Moreover the nanocomposites showed an increase in glass transition temperature from DSC (-18.82 for FIL 0 to -14 for FIL 2) analysis that supports the enhanced interaction between FKM and modified filler. Dynamic mechanical analysis of the nanocomposites proved the reinforcing ability and the effectiveness of ILrGO to enhance the properties as a whole. The dielectric study of the nanocomposites showed improved AC conductivity, dielectric constant value (60 with 2 phr of IL content) and a decrease in dielectric heating coefficient value with increase in ILrGO content. These property combinations make the nanocomposites a multifunctional material.

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