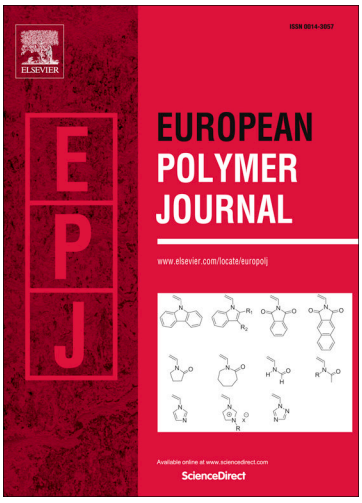

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The Influence of chloride and hydrogensulfate anions in two polymerised ionic liquids based on the poly(1-(hydroxyethyl)-3-vinylimidazolium cation, Synthesis, thermal and vibrational studies

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Abstract:

The chemical reaction of 2-chloroethanol with 1-vinylimidazol as precursor led to the corresponding compound 1-hydroxyethyl-3-vinylimidazolium chloride [EtOHVIM$^+$] [Cl$^-$]. In the next step, treatment of [EtOHVIM$^+$][Cl$^-$] with 2,2-azobisisobutyronitril (AIBN) afforded the poly1-(hydroxyethyl)-3-vinylimidazolium chloride (poly[EtOHVIM$^+$][Cl$^-$]), Finally, the reaction of (poly[EtOHVIM$^+$][Cl$^-$]) and sulfuric acid led to poly 1-(hydroxyethyl)-3-vinylimidazolium hydrogensulfate (poly[EtOHVIM$^+$][HSO_4^-]) by replacing the [Cl$^-$] halide by an [HSO_4^-] anion. The structure of these compounds was identified by ^{1}H-NMR, ^{13}C-NMR as preliminary spectroscopic characterization.

To obtain information on the structure and vibrational behaviour in these compounds, vibrational spectroscopy measurements were investigated by Fourier Transform-Infrared-Attenuated Total Reflectance and Fourier Transform Raman spectroscopy in the spectral range 600-4000 cm^{-1} and 4000–500 cm^{-1}, respectively. The Polymerization of IL gave rise to specific marks in the Raman and IR spectra and enhanced its vibrational property.

Also, in order to understand the thermal stability in these compounds, the results concerning the melting point, glass transition and decomposition were determined by thermogravimetric analysis (TGA), differential thermal (DTG), and differential scanning calorimetry (DSC).The results indicated that the poly [EtOHVIM$^+$][HSO_4^-] compound