# Gelatin-based electrolyte with $SiO_2$ nanoparticles

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Natural polymers are particularly interesting due to their richness in nature, their very low cost and principally their biodegradation properties. For these reasons different solid polymeric electrolytes (SPE) have been obtained using cellulose derivatives, starch, chitosan and rubber [1-3]. Physico-chemical modifications were made in the gelatin by the addition of the plasticizer glycerol, formaldehyde, and adding a source of protons from acetic acid, with the object to promote the ionic conductivity of the films. Finally, were added nanoparticles of $SiO_2$ (7 nm) in order to improve the properties of ionic conductivity of the electrolyte. This work presents the results of gelatin-based protonic SPEs, which were characterized by impedance spectroscopy, X-ray diffraction, UV–vis-NIR spectroscopy and scanning electron microscopy (SEM). The ionic conductivity results obtained for these SPEs were $2{,}0\times10^{-6}$ S/cm and $7\times10^{-5}$ S/cm at room temperature and 80 °C, respectively. Temperature-dependent ionic conductivity measurements were taken to analyze the mechanism of ionic conduction in polymer electrolytes. Conductivity results combined with transparency and good adhesion to the electrodes have shown that gelatin-based SPEs are very promising materials to be used as solid electrolyte in electrochromic devices.
Keywords: solid electrolyte, ionic conductivity, electrochromic devices, nanoparticles.

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