OC 5 - Thin Films of Photocrosslinkable Polymer Electrolytes Based on Chitosan Grafted with PEO Oligomers and a Furan Chomophore

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Polymer electrolytes fulfil an important role in such devices as solid-state batteries, smart windows, sensors and supercapacitors. The optimisation of their performances has gone through progressive refinements in terms of (i) the polymer solvating power with respect to the conducting ionic species (especially the lithium cation); (ii) the polymer segmental flexibility (low Tg); (iii) the polymer architecture (loosely cross-linked amorphous materials); (iv) the ionic transport number (favouring the cation mobility); and (v) the possibility of continuous processing in the shape of thin films with good mechanical properties.
The purpose of this communication is to show how certain moieties (furan chromophores) and film-forming macromolecular structures (chitosan) derived from renewable resources contribute in a decisive manner to achieve these goals and in particular point (v).
The materials described in this context were prepared by a double grafting procedure involving chitosan as the backbone film-forming substrate and both oligo(ethylene oxide) and a furan chromophore as appended moieties. The salt (lithium perchlorate) was dissolved into the branched polymer, which was then cast as a thin film and photocrosslinked by near-uv irradiation.
The thorough characterisation of these novel materials showed that they constitute an original solution to the science and technology of polymer electrolytes.