

**Development of polymeric electrolytes. Synthesis and properties of the copolymer styrene - 5-(4-pentenyl-oxyphenyl)-2-octyltetrazol to use as electrolyte**

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Due to the necessity of keeping the world economy stable, researches for alternative sources of energy are being conducted in the vast majority of research centers around the world. However, due to the high rate of pollution caused by fuel fossils, especially because of vehicles in general, clean energy sources have come to receive broader attention recently and fuel cells appear as magnificent sources for clean energy generation. In fuel cells, polymer membranes are used as electrolytes (Polymer Electrolyte Membrane Fuel Cells - PEMFC). Commonly used membranes are based in perfluorinated sulfonic acid, such as Nafion®. However, these materials have limitations for some applications, such as water dependency (to be able to exhibit proton conductivity), which limits the cells operation temperature and methanol permeability, hampering other applications than hydrogen cells. With the aim of elucidating the relationship between structure and properties, a new electrolytic copolymer involving the monomers 5-(4-pentenyl-oxyphenyl)-2-octyltetrazol and styrene was prepared. The copolymer was synthesized in the molar ratio of 92:8 of styrene:5-(4-pentenyl-oxyphenyl)-2-octyltetrazol and characterized in its chemical structure, thermal stability, and thin films morphology. In order to obtain copolymer features and the effect of the structure on the material, physical properties and conductivity were also investigated.

