

IONIC CONDUCTIVITY OF SILOXANE BASED POLYMER ELECTROLYTES WITH PROPYLACETOACETATE PENDANT GROUPS

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Hydrosilylation reaction of 2.4.6.8-tetrahydro-2.4.6.8-tetramethyl-cyclotetra-siloxane (D_4^H) with allyl aceto-acetate at 1:4.1 molar ratios of initial compounds in the presence of platinum hydrochloric acid (0.1 M solution in THF), Karstedt's catalyst ($Pt_2[(VinSiMe_2)_2O]_3$) and platinum on the carbon have been studied and D_4^R type compounds have been obtained. Reaction order, rate constants and activation energies have been determined for hydrosilylation reactions in the presence of Karstedt's catalyst.

Ring opening polymerization reaction of D_4^R in the presence of catalytic amount of powder-like potassium hydroxide has been carried out. Linear methylsiloxane oligomer with regular arrangement of propyl acetoacetate groups in the side chain has been obtained. The synthesized methylorganocyclotetrasiloxane and oligomers were studied by FTIR, 1H , ^{13}C , ^{29}Si NMR spectroscopy. Comb-type oligomers were characterized by size-exclusion chromatography, wide-angle X-ray and differential scanning calorimetric methods.

Via sol-gel processes of doped with lithium trifluoromethylsulfonate (triflate) or lithium bis(trifluoromethylsulfonyl)imide oligomer systems solid polymer electrolyte membranes have been obtained.

The electrical conductivity of these materials at room temperature belongs to the rather wide range of electrical conductivity magnitudes (10^{-10} to 10^{-4} S·cm⁻¹) and depends on the structures of grafted anion receptors and the polymer backbones. High values of specific volumetric electric conductivity of the membranes containing triflate are due to relatively high mobility of the anions of this salt in all working ranges of temperature.