SPECIFIC CONDUCTIVITY OF PMMA BASED GEL ELECTROLYTES CONTAINING LITHIUM SALTS

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ABSTRACT

A subject of research was checking and obtaining new pieces of knowledge about specific electric conductivity of PMMA based gel electrolytes.

1 INTRODUCTION

A subject of our research was the specific electric conductivity of PMMA based gel electrolytes. Samples containing solutions of lithium salts with different molar concentration in propylene carbonate were investigated. These samples was mixed with monomeric and oligomeric methylmethacrylate, after that we have obtained an elastic and homogenous polymer with good optical properties.

2 ANALYSIS

Four – point method was used for the estimation of specific electric conductivity at the voltage of 1 V and frequency 10 kHz in the course of 10 days. This method is apt for measuring electric conductivity on semiconductors and hard electrolytes. They were prepared form solutions of LiClO4 and concentrations 0.25M, 0.5M, 0.75M and 1M (labeled as Sample 1 to Sample 4).

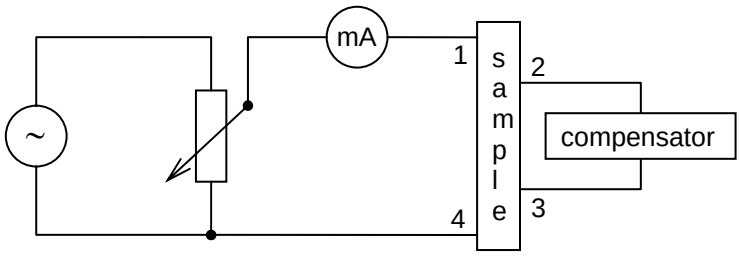

Fig. 1: *Cabling diagram for four-points method*

The specific conductivity σ changes according to the empirical formulas:

$$\sigma = 1.89 \,.\, 10^{-4}\, c(LiClO_4) + 3.0 \,.\, 10^{-4} \qquad (1)$$

with the correlation coefficient $R = 0.6326$ for the fresh sample and

$$\sigma = 4.86 \,.\, 10^{-5}\, c(LiClO_4) + 1.57 \,.\, 10^{-4} \qquad (2)$$

with the correlation coefficient $R = 0.9862$ for the sample of age 10 days (σ in $S.cm^{-1}$ and c in $mol.l^{-1}$). This investigation will proceed for longer time intervals.

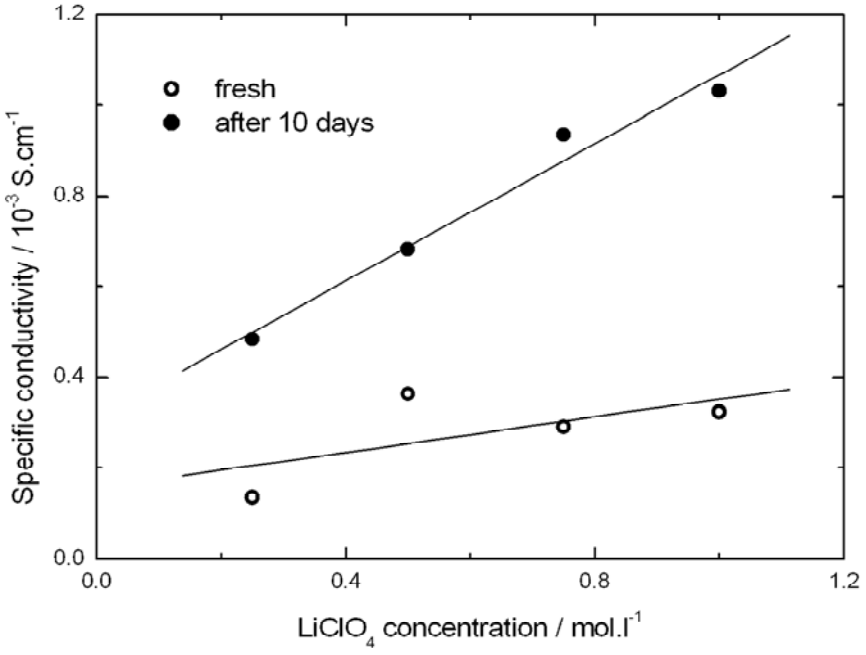

Fig. 2: *Influence of the salt concentration on the specific conductivity*

ACKNOWLEDGEMENTS

The paper has been prepared as a part of the solution of GAČR project No. 104/02/0731 and with the support Grant Agency of the Academy of Sciences of Czech Republic grant No. A 403 2002.

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