

# SPECIFIC CONDUCTIVITY OF PMMA BASED GEL ELECTROLYTES CONTAINING CADMIUM, MAGNESIUM OR LITHIUM SALTS

*O. Krejza, T. Nováček, J. Vondrák\*, M. Sedlaříková*

*Institute of Electrochemistry, Brno University of Technology  
krejza@kn.vutbr.cz*

*\*Institute of Inorganic Chemistry, AV ČR, Řež u Prahy*

A subject of our research was checking and obtaining new pieces of knowledge about specific electric conductivity of PMMA based gel electrolytes. Measuring was surveyed on samples that have contained solution of salts (Cd, Mg, Li) with different molar concentration in propylencarbonate. These samples was mixed with monomeric and oligomeric methylmethacrylate, after that we have obtained an elastic and homogenous polymer with good optical properties.

Measuring of specific electric conductivity had 10 kHz frequency range and temperature range was between 25 and -70°C. Samples were fixed between two stainless steel sheets with accurately defined proportion. This electrode system was situated into the liquid nitrogen cooled vessel with denaturated alcohol.

In the area of negative temperature was measured 6 cycles (25 -20; 25 -30; 25 -40; 25 -55; 25 -70; 25 0°C). It was very important for checking reproducibility specific electric conductivity spot samples, which was achieved in 1st cycle at temperature 25 °C. There was observed 25 minutes long interval for smooth transition undercooling electrode system on 25°C. Between 4th and 5th cycle was 14 hours time out. In the 5th cycle after regeneration the specific el. conductivity of the gel with composition of (50% 0,25M MgClO<sub>4</sub> + 50% 0,25M CdLiO<sub>4</sub>) increased up to 29,2% opposite to its original value. Lowest increase 7,5% had gel with composition (0,5M LiClO<sub>4</sub>) opposite to its original value. It was possible to see the same phenomenon on the other samples. Specific el. conductivity had between cycles 1 and 4, after the regeneration to the temperature of 25°C, rather decreasing trend.

Measured samples were stored for later research the influence of temperature on the specific electric conductivity. Even after the repeating these cycles, mechanical characters of researched samples had no expressive changes.

## **Acknowledgments:**

*This work was supported by the Grant Agency of the Academy of Sciences of Czech Republic (Grant No. A 403 2002 and by the grant Agency of Czech Republic (Grant No. 104/02/0731)*