

## Accepted Manuscript

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PII: S1572-6657(16)30541-0  
DOI: doi: [10.1016/j.jelechem.2016.10.021](https://doi.org/10.1016/j.jelechem.2016.10.021)  
Reference: JEAC 2888

To appear in: *Journal of Electroanalytical Chemistry*

Received date: 20 May 2016  
Revised date: 6 September 2016  
Accepted date: 10 October 2016



Please cite this article as: Zhu Ping, Lv XiaoJing, Ren Anye, Gao Peng, Preparation of a novel porous gel electrolyte and its application in micro supercapacitor, *Journal of Electroanalytical Chemistry* (2016), doi: [10.1016/j.jelechem.2016.10.021](https://doi.org/10.1016/j.jelechem.2016.10.021)

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# Preparation of a novel porous gel electrolyte and its application in micro supercapacitor

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## Abstract:

The present paper explores preparation of gel electrolyte and composition methods applied in micro supercapacitor. By virtue of scanning electron microscopy (SEM), X-ray photoelectron spectroscopy (XPS), differential scanning calorimeter (DSC), electrochemical workstation, and LCR Meter, it studies comparatively the surface morphology, thermal stability of the polyvinyl alcohol – potassium hydroxide – potassium thiocyanate – ethylene glycol (PVA-KOH-KSCN-EG) and PVA-KOH-KSCN gel electrolytes and electrochemical compatibility with polypyrrole / graphene oxide - ruthenium oxide (PPy/GO-RuO<sub>2</sub>) membrane electrode for micro supercapacitor. The study shows that the PVA-KOH-KSCN-EG gel electrolyte at 70°C has a good thermal stability, easily entering the structure of micro three-dimensional mould cavity with high aspect ratio, which increases the actual distribution area of the electrolyte entering pore domain of membrane material, reaching the purpose of increasing the effective area of polarizing electrode. The added EG in PVA-KOH-KSCN gel electrolyte for modification not only improves the particle conductivity, but also has sound chemical compatibility with PPy/GO-RuO<sub>2</sub> membrane electrode, improving cycle performances, decreasing the resistance, and ameliorating diffusion phenomenon of capacitance in micro supercapacitor. The conclusion is drawn that PVA-KOH-KSCN-EG gel solution system enhances cycle performances, capacitance retention

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