

Supplementary material

Eco-Friendly Solid Polymer Electrolytes Doped with NaClO₄ for next-generation energy storage devices: Structural and Electrochemical Insights

Vipin Cyriac^a, Ismayil^{a*}, Kuldeep Mishra^b, Ankitha Rao^c, Riyadh Abdekadir Khellouf^d, Saraswati P Masti^e, I. M Noor^{f,g}

^a*Department of Physics, Manipal Institute of Technology, Manipal Academy of Higher Education, Manipal 576104, Karnataka, India*

^b*Symbiosis Institute of Technology (SIT), Symbiosis International (Deemed university) (SIU), Pune 412115, Maharashtra, India*

^c*Department of Electronics and Communication, Manipal Institute of Technology, Manipal Academy of Higher Education, Manipal 576104, Karnataka, India*

^d*Centre of Polymer Systems, University Institute, Tomas Bata University in Zlin, Tr. T. Bati 5678, 760 01 Zlin, Czech Republic*

^e*Department of Chemistry, Karnataka University's Karnataka Science College, Dharwad, Karnataka 580001, India*

^f*Ionic Materials and Energy Devices Laboratory, Physics Department, Faculty of Science, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor Darul Ehsan, Malaysia*

^g*Physics Division, Centre for Foundation Studies in Science of Universiti Putra Malaysia, Universiti Putra Malaysia, 43400 Serdang, Selangor Darul Ehsan, Malaysia*

^{*}*Corresponding Author e-mail: ismayil.mit@manipal.edu, ismayil.486@gmail.com, Tel: +91 98454 97546*

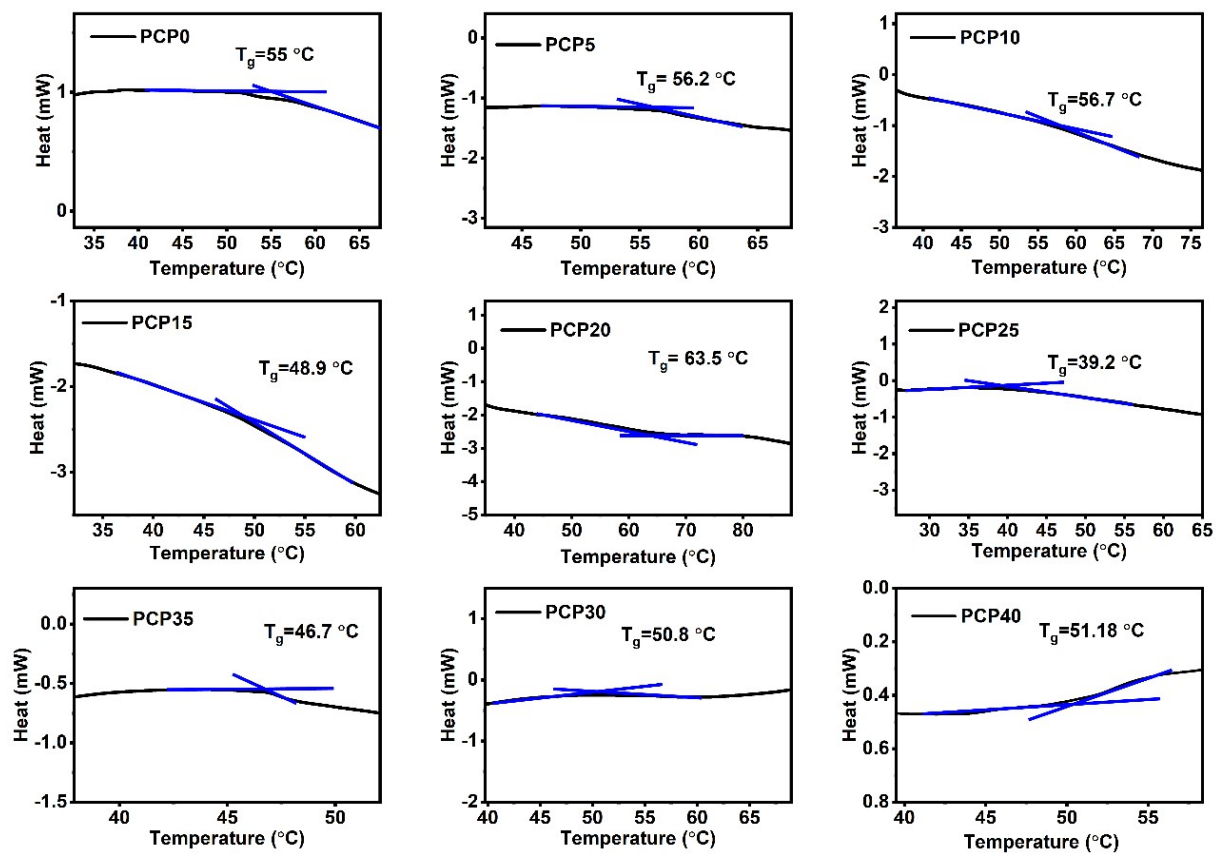


Figure S1: Glass transition temperature variation in PVA/CS-NaClO₄ SPEs

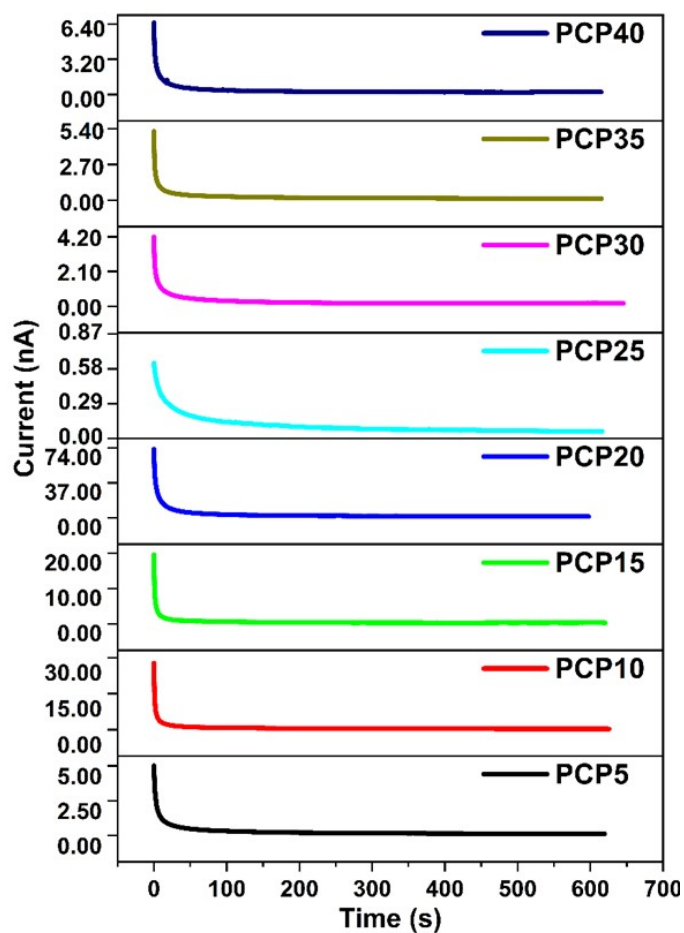


Figure S2: Current vs. time plot for NaClO₄ doped SPEs.

Table S1: Values of t_{ion} , and σ_{ion} of SPEs obtained from TNM measurements

Sample	t_{ion}	$\sigma_i(\text{S cm}^{-1})$
PCP5	0.978	9.58×10^{-08}
PCP10	0.990	4.09×10^{-07}
PCP15	0.984	1.76×10^{-06}
PCP20	0.983	1.08×10^{-05}
PCP25	0.986	3.33×10^{-05}
PCP30	0.958	4.84×10^{-05}
PCP35	0.977	5.11×10^{-04}
PCP40	0.965	3.12×10^{-04}

Table S2: Mechanical properties of PVA/CS-NaClO₄ SPEs

Sample	Tensile strength (MPa)	Elongation at break (%)	Young's modulus (MPa)
PCP0	55.3±2.6	8.1±1.1	2200±700
PCP5	43.5±1.6	23.85±0.64	910±110
PCP10	22.1±3.2	11.3±3.6	510±90
PCP15	24.3±6.9	25.1±6.8	250±29

PCP20	14.1±2.3	22.8±3.7	126±3.6
PCP25	11.7±5.9	22.9±10.1	98±12
PCP30	9.01±0.41	22.2±3.1	74.8±9.3
PCP35	14.3±5.3	21.5±9.3	130±47
PCP40	5.9±1.5	27.8±4.3	24±3.8
