

## SUPPORTIN INFORMATION

### **Studies on the Preparation and Characterization of Poly(vinyl alcohol-co-styrenesulfonic acid)-Based Proton Exchange Membranes for Direct Methanol Fuel Cell**

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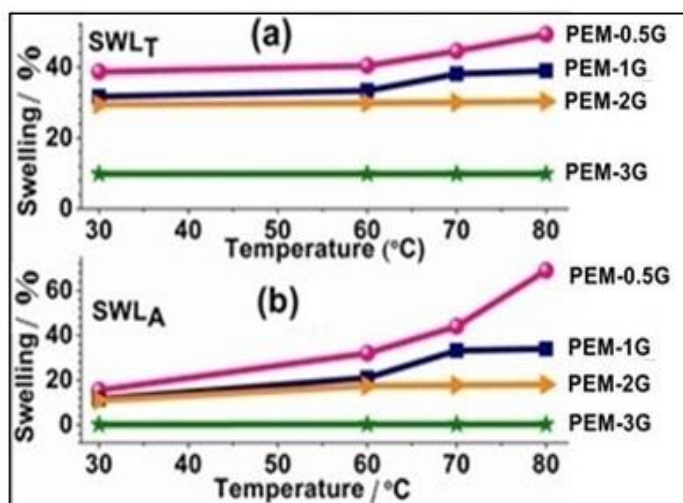
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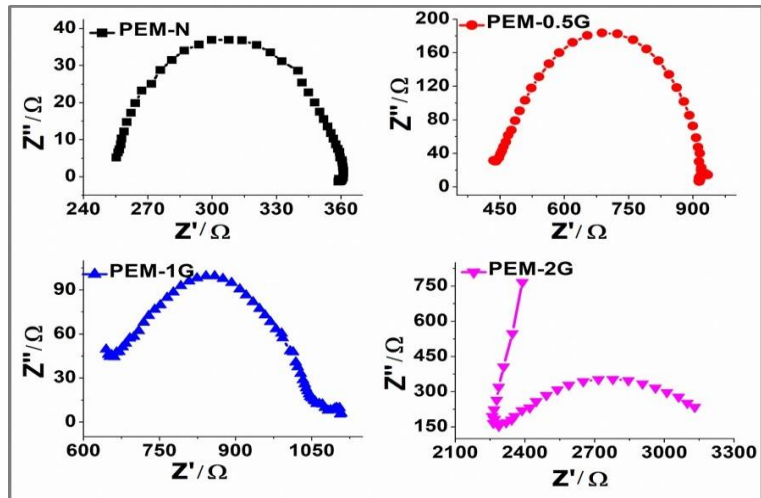
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**Figure S1.** (a) Thickness swelling ( $SWL_T$ ), and (b) Area swelling ( $SWL_A$ ) of homogeneous PEMs crosslinked using different concentration of GA.



**Figure S2.** Impedance spectra of PEM-N, PEM-0.5G, PEM-1G, and PEM-2G acquired at 25 °C.



**Figure S3.** Proton conduction mechanism throughout the PEM based on PVA-co-SSA.

