Support Information

Phosphotungstic acid functionalized silica nanocomposites with tunable bicontinuous mesoporous structure and superior proton conductivity and stability for fuel cells

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1. The proton conductivity measurement

Similar to Nafion membranes, the proton conductivity in this work was calculated as follows:

$$\sigma = \frac{L}{R_{mem} A_{electrode}} \quad (1)$$

Where L is the thickness of the membrane, $A_{electrode}$ is the effective area of electrode, R_m is the membrane resistance measured from the high frequency intercept of the complex impedance curves. Figure S1 shows an example of EIS data of the HPW-meso-silica membrane (Nyquist plot), measured at different temperatures. The resistance of the membrane was measured from the high frequency intercept from the impedance real axis.

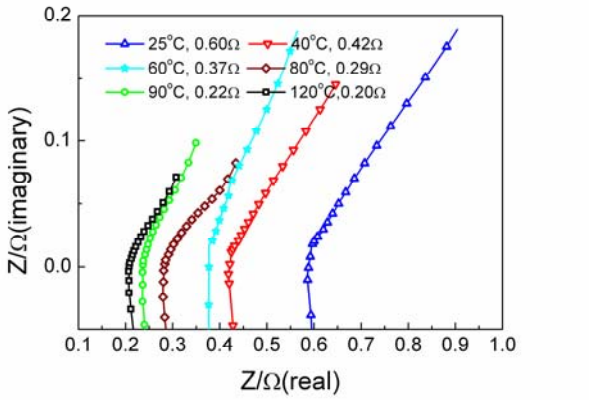

Figure S1. Nyquist plot of the HPW-meso-silica membrane

2. FT-IR spectra

FTIR spectra of HPW, mesoporous silica and HPW-meso-silica nanocomposites measured at room temperature. The FTIR spectra show the incorporation of HPW in the meso-silica matrix framework.

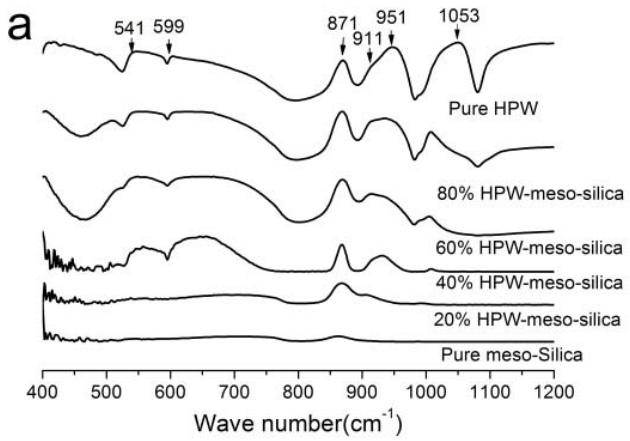

Figure S3. FTIR spectra of pure HPW, meso-silcia and HPW-meso-silcia nanocomposites.