Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supporting Information

Aerogels of Hierarchically Porous Syndiotactic Polystyrene with Dielectric Constant Near to Air

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Fig. S1 Photographic image of ethanol derived porous sPS

Fig. S2(a) and (b) are gel and aerogel of sPS0.3g/g respectively and (c) free standing ultra low density sPS aerogel.

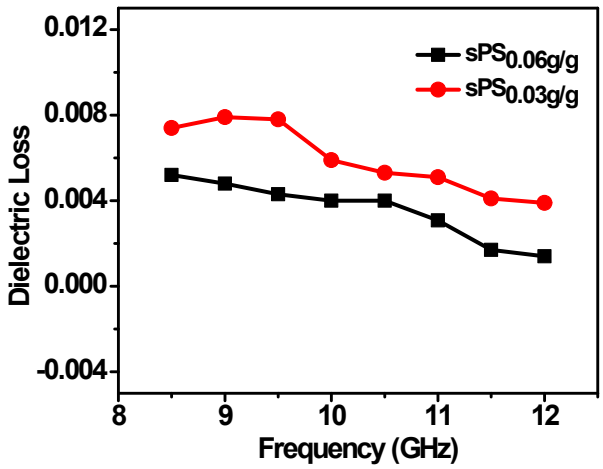

Fig. S3 Dielectric loss measured for sPS aerogel samples of different porosity

Different model formulas used to calculate the effective dielectric constant of the porous aerogel are given below.

Maxwell's equation of Volume Averaging Theory

$$\varepsilon_{eff} = (1 - P)\varepsilon_m + P\varepsilon_{air} \qquad (1)$$

Lichtenecker's rule

$$\log \varepsilon_{eff} = P\log \varepsilon_{air} + (1 - P)\log \varepsilon_m \qquad (2)$$

Maxwell Garnet Equation

$$\frac{\varepsilon_{eff} - \epsilon_{air}}{\varepsilon_{eff} + 2\varepsilon_{air}} = (1 - P)\frac{\varepsilon_m - \epsilon_{air}}{\varepsilon_m + 2\epsilon_{air}} \qquad (3)$$

Parallel model

$$\varepsilon_{eff} = \varepsilon_m - (\varepsilon_m - \varepsilon_{air})P \qquad (4)$$

Serial model

$$\frac{1}{\varepsilon_{eff}} = \frac{1}{\varepsilon_m} + \left(\frac{1}{\varepsilon_{air}} - \frac{1}{\varepsilon_m}\right)P \qquad (5)$$

In all the cases, ε_{eff} is the effective dielectric constant, ε_{air} is the dielectric constant of air (~1) and ε_m is the dielectric constant of the polymer (~2.6) while P is the porosity of the aerogel.

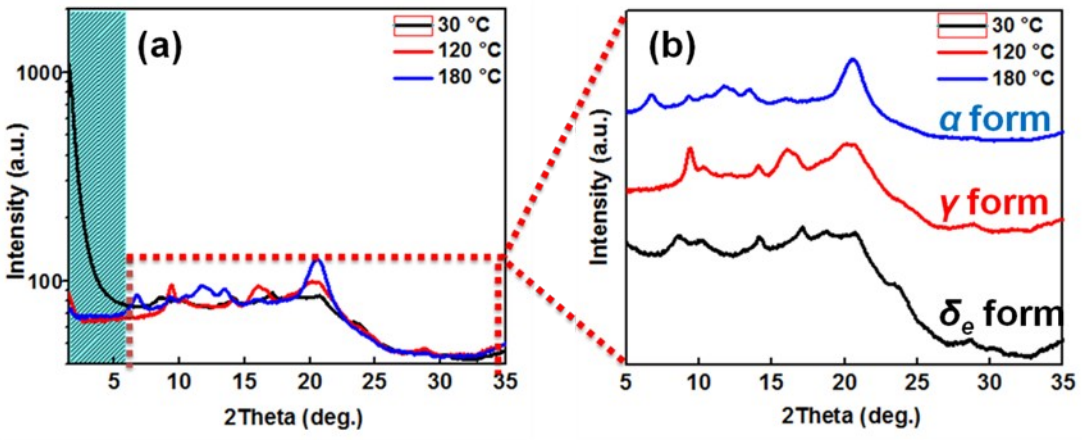

Fig. S4WAXD patterns of (a) sPS_{eth} annealed at different temperatures and (b) its magnified view of the region from 2θ =5-35°.

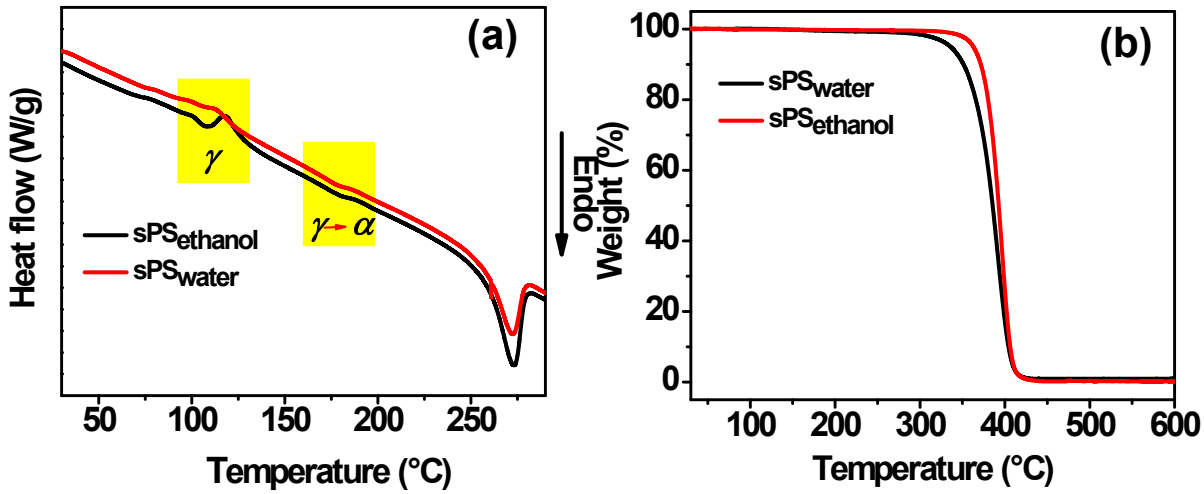

Fig.S5 (a) DSC (b)TGA thermograms of $sPS_{water(0.03g/g)}$and sPS_{eth}samples

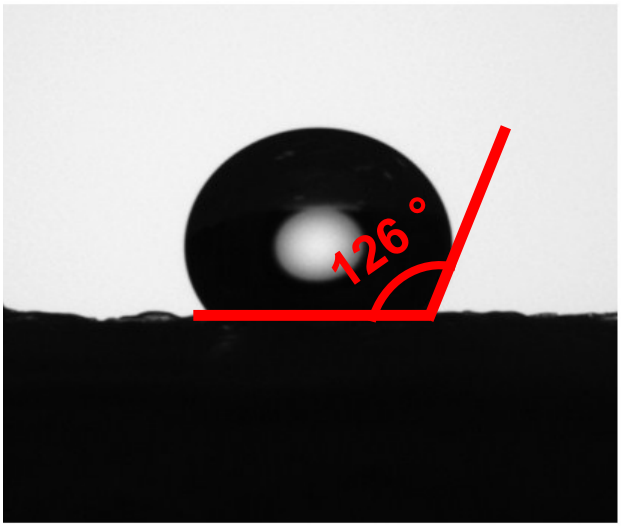

Fig. S6 (a) Water contact angle of $sPS_{0.06g/g}$ aerogel