Poly(vinylidene fluoride) nanofibrous mats with covalently attached SiO_2 nanoparticles as ionic liquid host: enhanced ion transport for electrochromic device and lithium-ion battery

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(Electronic Supplementary Information)

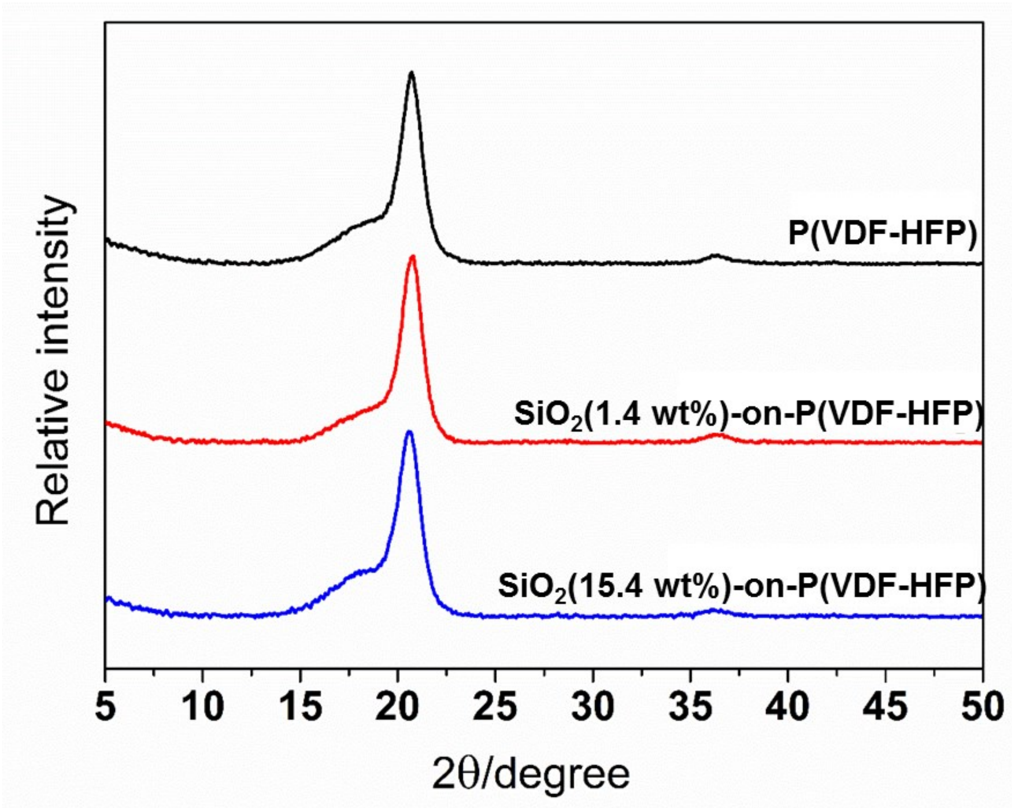

Fig. S1. WAXD patterns of SiO_2-on-P(VDF-HFP) nanofibrous electrospun mats with different SiO_2 content.

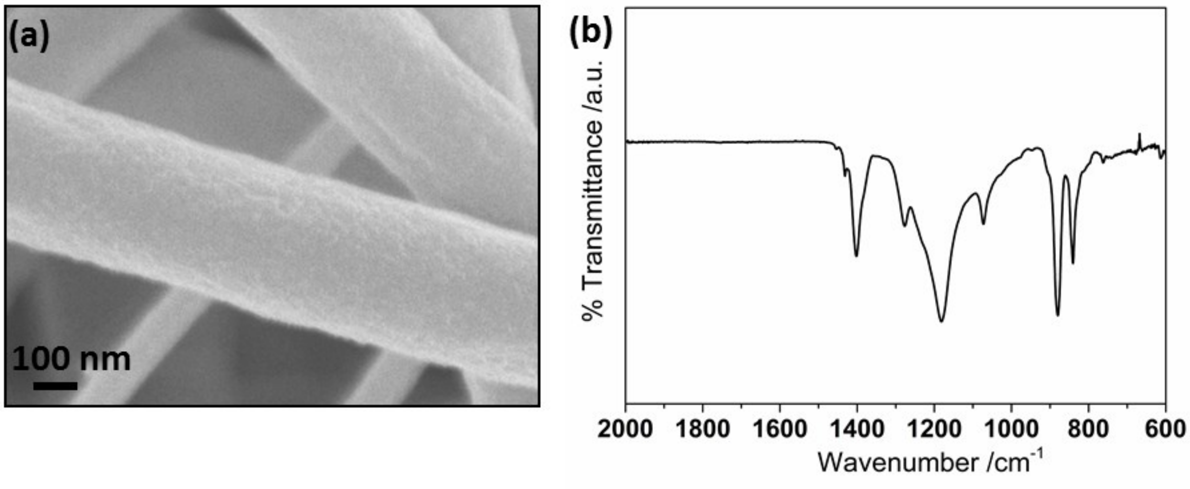

Fig. S2. (a) SEM image and (b) FTIR spectrum of the neat P(VDF-HFP) electrospun mat after sol-gel process.

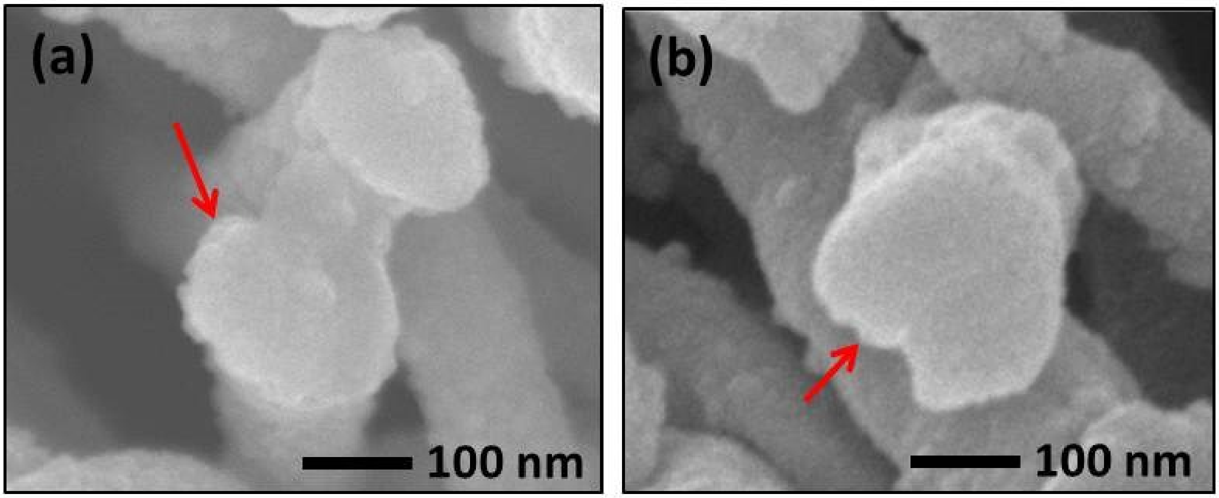

Fig. S3. SEM images of the cross-section area of SiO_2-on-P(VDF-HFP) fibers.

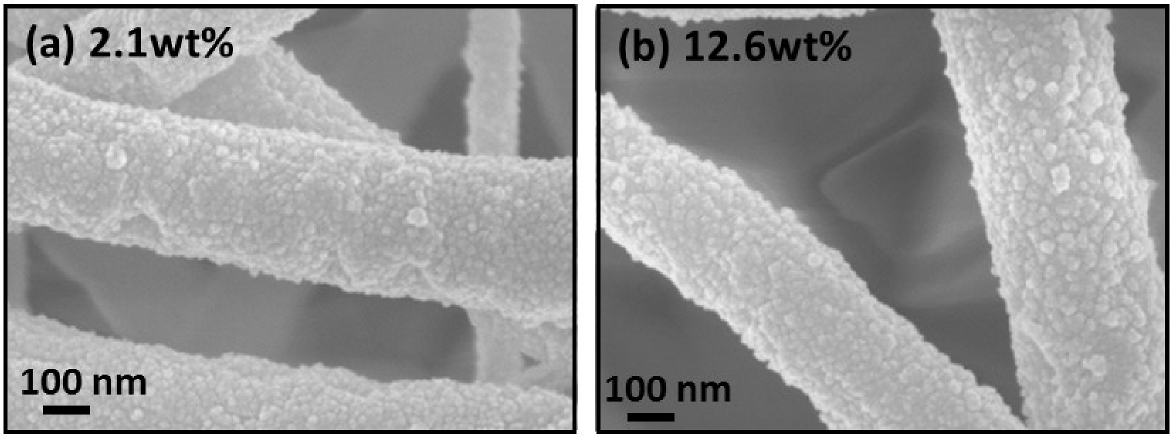

Fig. S4. SEM images of SiO_2-on-P(VDF-HFP) nanofibrous electrospun mats with (a) 2.1 wt% and (b) 12.6 wt% SiO_2.

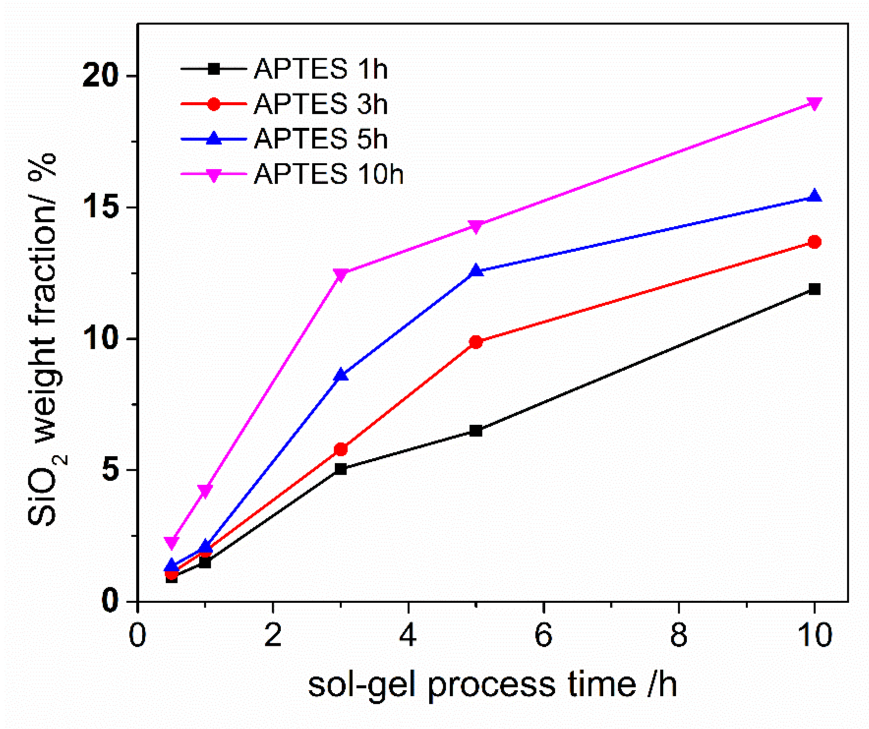

Fig. S5. SiO_2 contents in the hybrid mats for different silane (APTES) grafting time and sol-gel processing time.

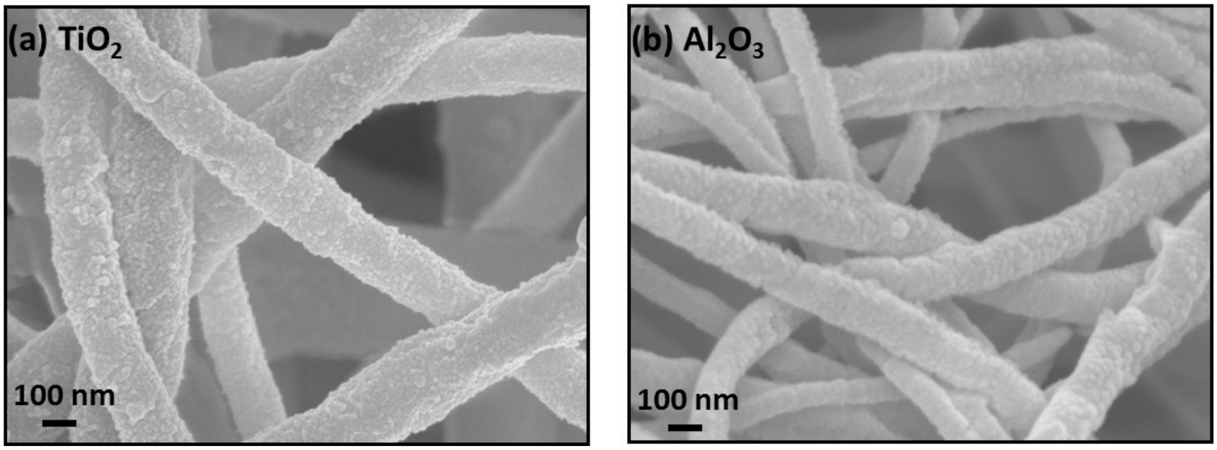

Fig. S6. SEM images of P(VDF-HFP) nanofibrous electrospun mats with 1.5 wt% surface-attached TiO_2 and Al_2O_3, respectively.

Table S1. Electrolyte uptake and ionic conductivity of electrospun mats after loading with $BMIM^+BF_4^-$ (measured at 20 ^oC).

Electrospun mat	Electrolyte uptake (%)	Ionic conductivity ($mS\ cm^{-1}$)
Neat P(VDF-HFP)	440	2.6±0.2
1.4 wt% SiO_2	500	7.8±0.4
1.5 wt% TiO_2	460	5.7±0.3
1.5 wt% Al_2O_3	450	4.8±0.4