Journal of Materials Chemistry A

Phase stability and high conductivity of ScSZ nanofibers: effect of the crystallite Size

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Supporting Information

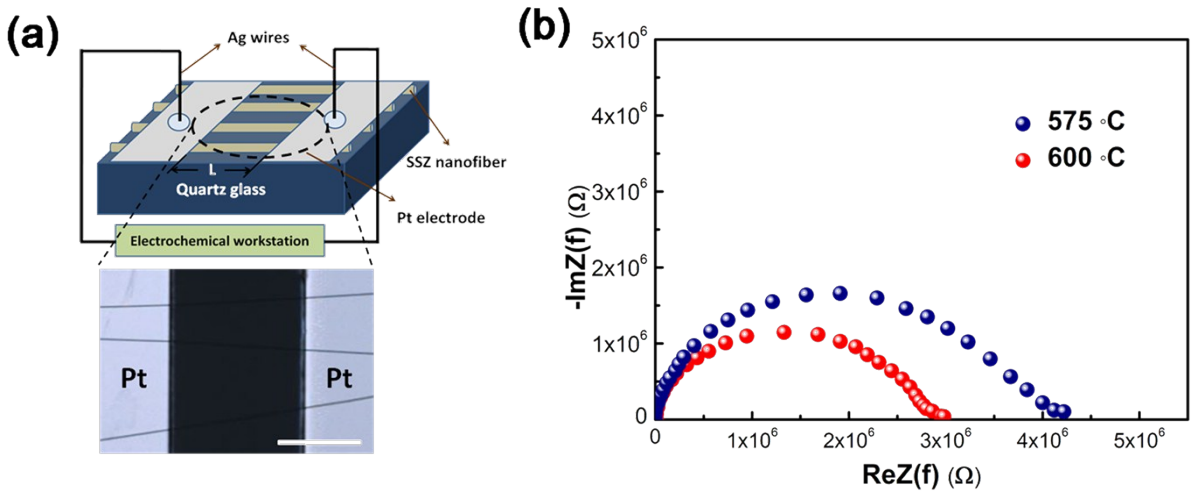

Fig. S1 (a) Schematic illustration of the aligned nanofibers on the quartz substrate for characterizations of electrical conductivities and a typical laser scanning confocal micrograph of the highly aligned 10ScSZ nanofibers on two Pt electrodes; (b) Typical electrochemical impedance spectra of 10ScSZ nanofibers measured at 575 °C and 600 °C. SSZ in (a) stands for 10ScSZ and *L* represents the distance between two Pt electrodes. Scale bar: 20 μm.

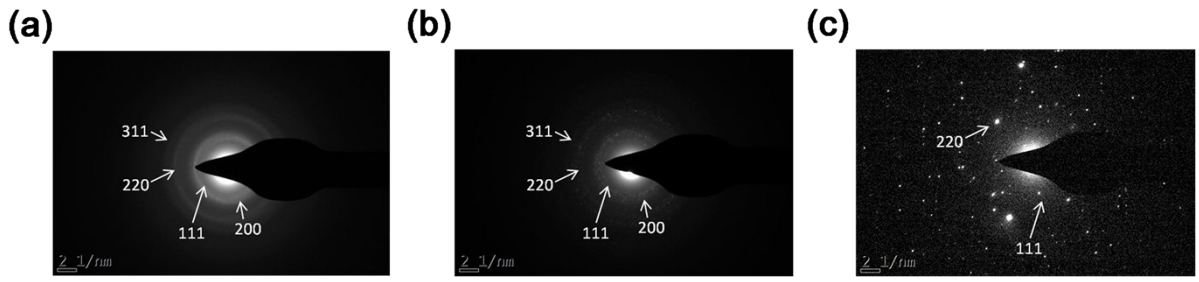

Fig. S2 SAED images of 10ScSZ nanofibers calcined at different temperatures: (a) 550 °C; (b) 800 °C and (c) 1000 °C.

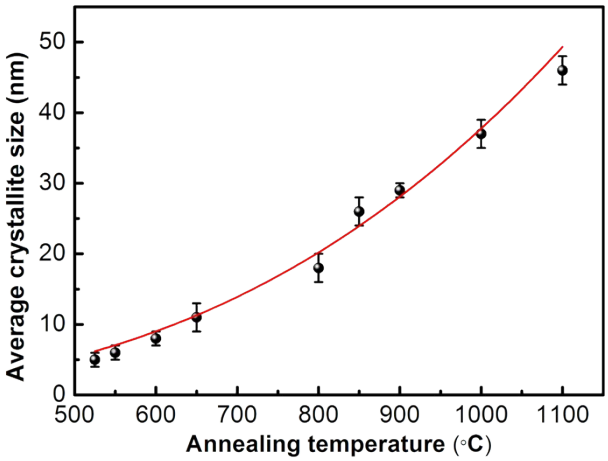

Fig. S3 Average crystallite sizes of 10ScSZ nanofibers calcined at different temperatures.

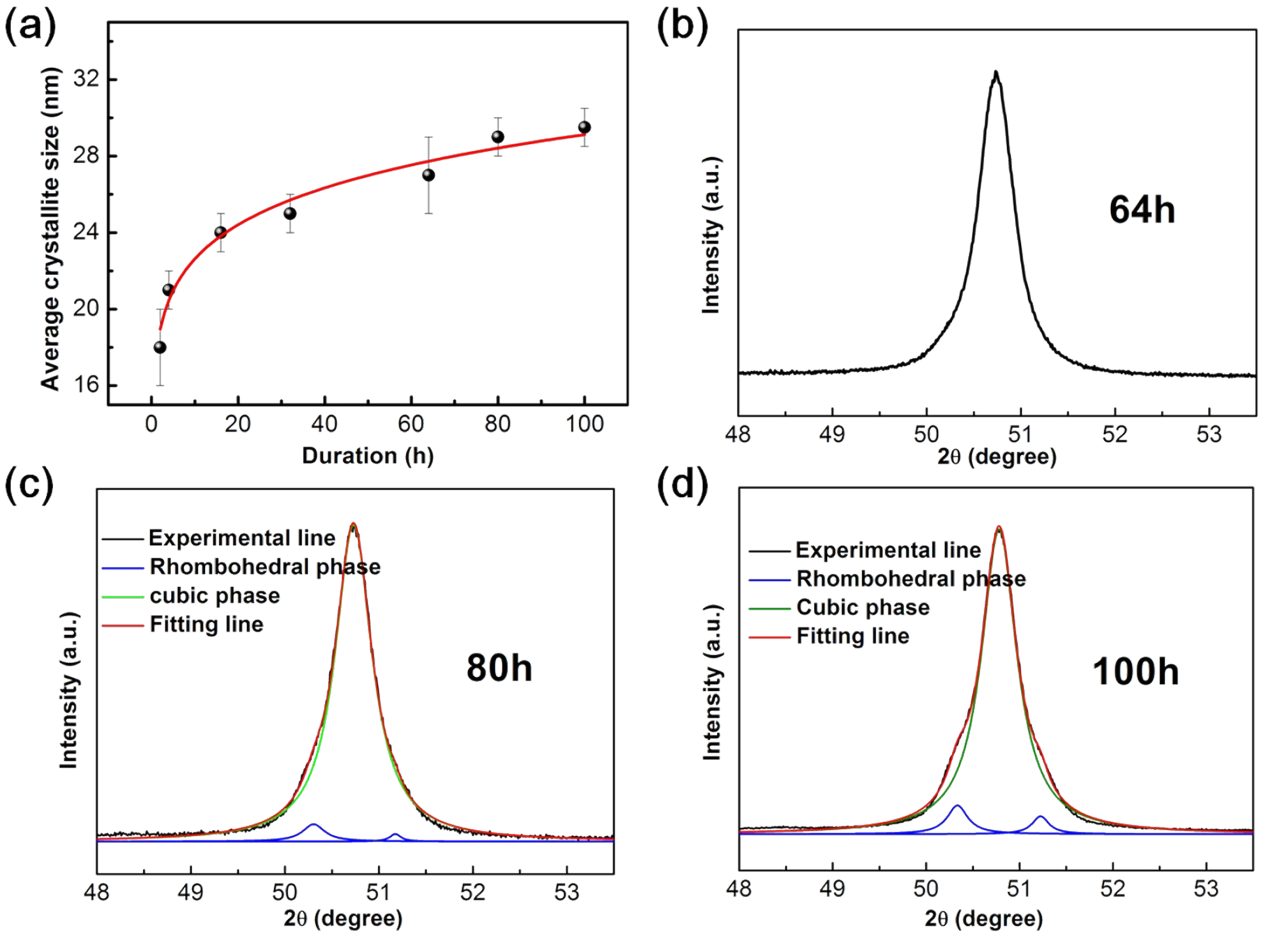

Fig. S4 (a) Average crystallite sizes of 10ScSZ nanofibers calcined at 800 °C with different durations; Step scanning XRD patterns of the (220) peak for 10ScSZ nanofibers calcined at 800 °C with (b) 64 h; (c) 80 h and (d) 100 h.

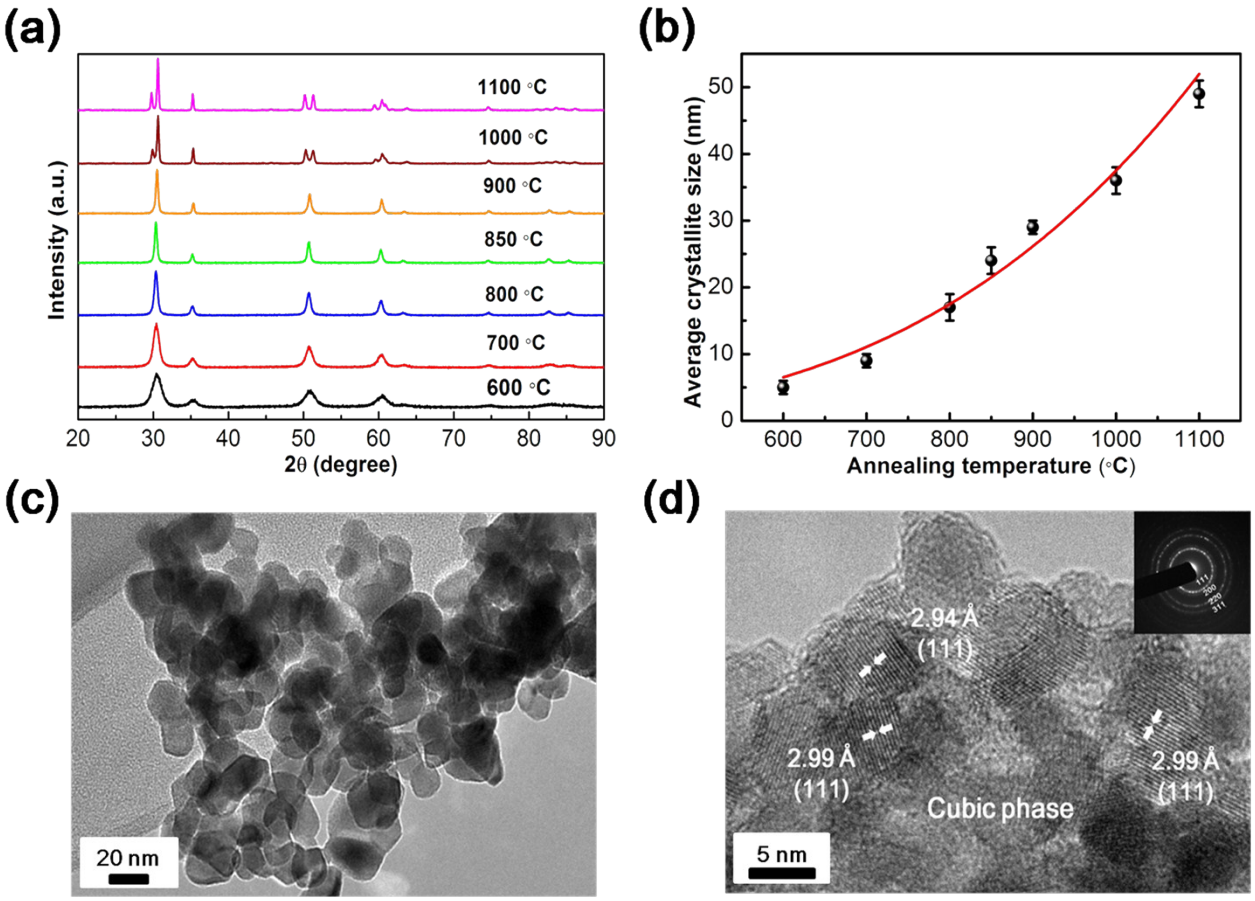

Fig. S5 (a) XRD patterns and (b) average crystallite sizes of 10ScSZ nanopowders calcined at different temperatures; (c) TEM image of 10ScSZ nanopowders calcined at 700 °C; (d) HRTEM image of 10ScSZ nanopowders calcined at 600 °C.

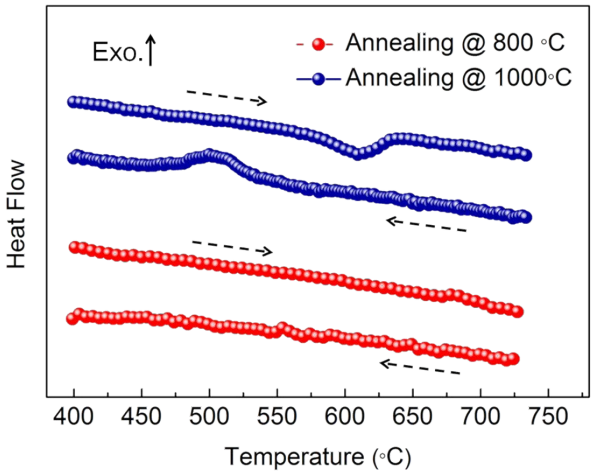

Fig.S6 DSC curves of 10ScSZ nanofibers calcined at 800 °C and 1000 °C.

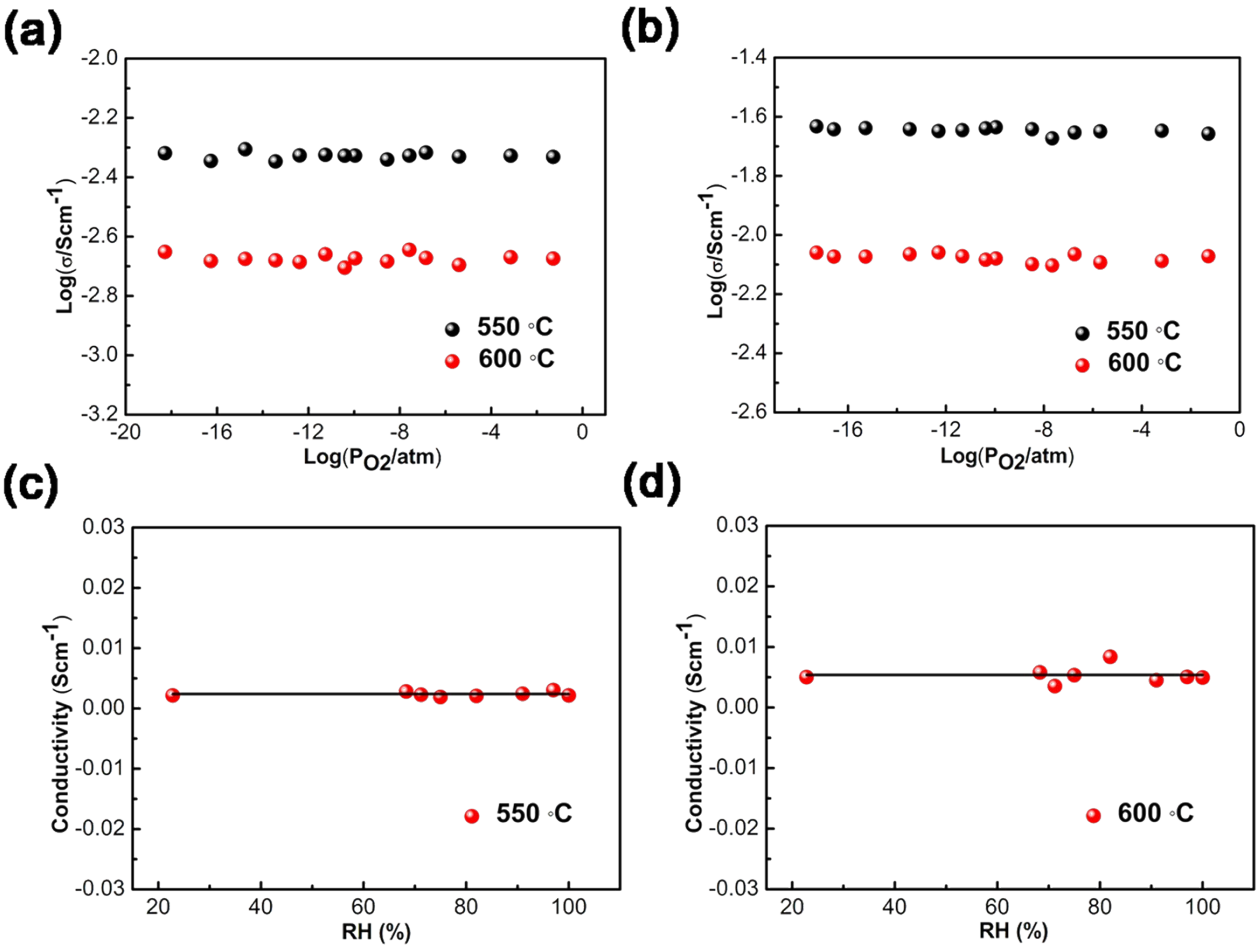

Fig. S7 Electrical conductivities of 10ScSZ nanofibers calcined at 550 °C and 600 °C measured at (a) 400 °C and (b) 500 °C under different oxygen pressures; Electrical conductivities of 10ScSZ nanofibers measured at (c) 550 °C and (d) 600 °C under different humidities.

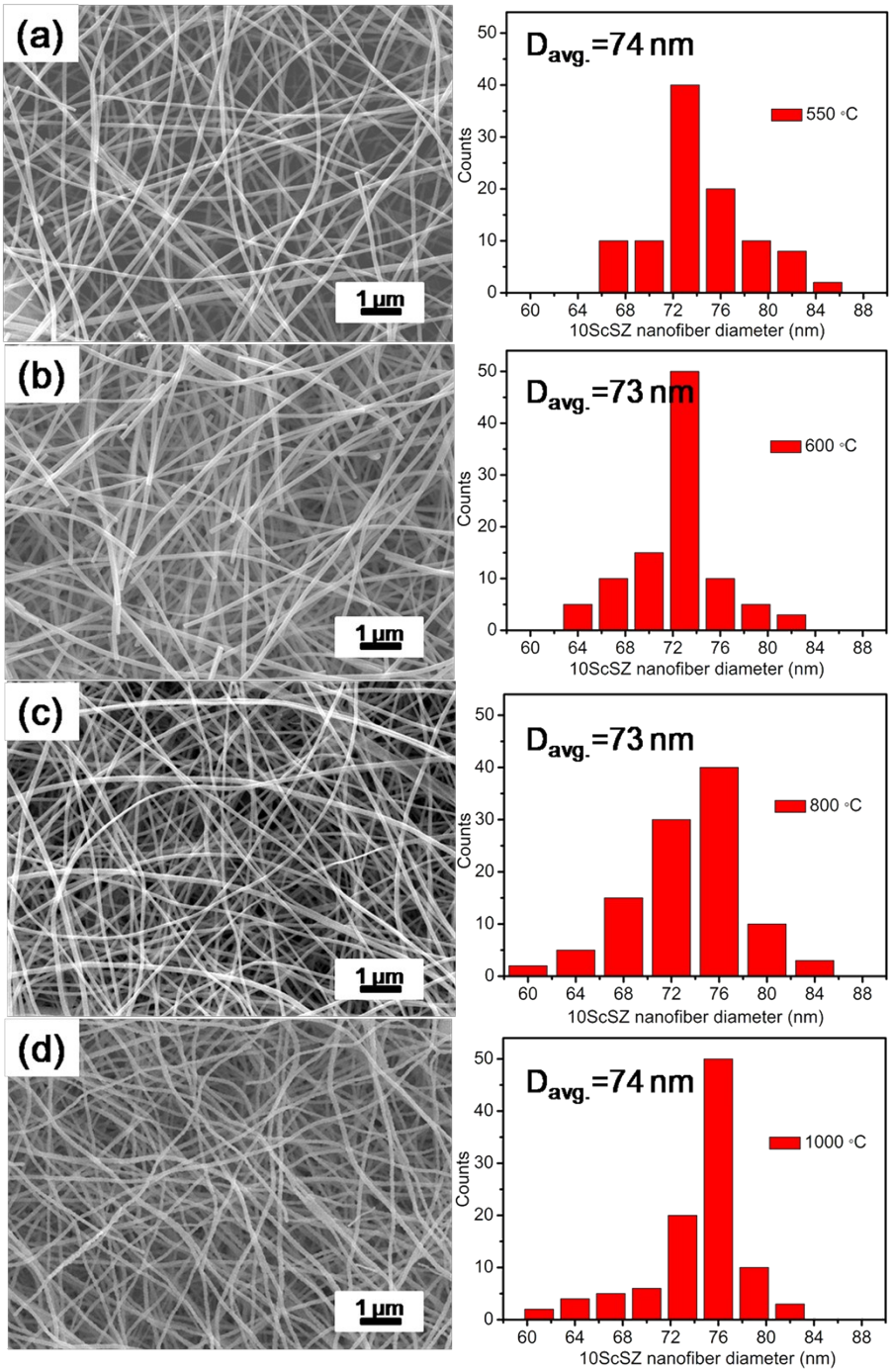

Fig. S8 SEM images of 10ScSZ nanofibers calcined at different temperatures and diameter distributions of the corresponding sample: (a) 550 °C; (b) 600 °C; (c) 800 °C and (d) 1000 °C. $D_{avg.}$ represents the value of the average diameter of nanofibers.