Electronic Supplementary Information (ESI)

Electrospun ZrO$_2$ Nanofibers: Precursor Controlled Mesopore Ordering, and Evolution of Garland-Like Nanocrystal Arrays

Shreyasi Chattopadhyay, a Sandip Bysakh, b Jony Saha a,c and Goutam De* a,b,d

aNano-Structured Materials Division, CSIR-Central Glass and Ceramic Research Institute, 196, Raja S. C. Mullick Road, Kolkata 700032, India.
bAdvanced Materials Characterization Unit, CSIR-Central Glass and Ceramic Research Institute, 196, Raja S. C. Mullick Road, Kolkata 700032, India.
cPresent Address: School of Chemical Sciences and Pharmacy, Central University of Rajasthan, Rajasthan, Kishangarh-305817, India.
dPresent Address: Institute of Nano Science and Technology, Mohali, Punjab 160062, India
*E-mail: gde41@hotmail.com, gde@inst.ac.in
Tel: +91 9433319119.

Fig. S1 FTIR spectral analysis of dried and heat-treated ZrO$_2$ fibers: (a) ZrF-P (b) ZrF-S.
**Fig. S2** (a) High and (b) low angle XRD patterns of ZrO$_2$ fibers heat-treated at 350 °C (ZrF-P$_{350}$ and ZrF-S$_{350}$).

**Fig. S3** TEM analysis of (a) ZrF-P$_{500}$ and (b) ZrF-P$_{900}$ showing the disordered mesopores and the collapse of mesoporosity due to random crystal growth on heat-treatment, respectively. Insets of (a) and (b) showing HRTEM image acquired from the fiber samples.
Fig. S4 XRD pattern of ZrF-S_{1100} shows formation of monoclinic ZrO_2 phase after heat-treatment at 1100 °C.

Fig. S5 N_2 sorption analysis of mesoporous ZrO_2 fibers (a) ZrF-P_{500} and (b) ZrF-S_{500}, respectively heat–treated at 500 °C. The insets of the figures show the pore size distributions.
Fig. S6 N₂ sorption analysis of (a) ZrF-S₉₀₀ and (b) ZrF-S₁₁₀₀ heat–treated at 900 and 1100 °C, respectively. The insets show the pore size distributions.