Electronic Supplementary Material (ESI) for Materials Chemistry Frontiers.

Electronic Supporting Information

One pot rapid synthesis of ultra high strength hydrophobic silica aerogels

Xian Yue, Junyong Chen, Huaxin Li, Zhou Xiao, Xianbo Yu, and Junhui Xiang *

Center of Materials Science and Optoelectronics Engineering, College of Materials Sciences , University of Chinese Academy of Sciences, Beijing 100049, P. R. China.

E-mail: xiangjh@ucas.ac.cn (J.X.)

Table S1. Preparation of silica aerogels with different MTMS molar ratio.

NO.	MTMS	H_2O	$H_2C_2O_4$ [g]	Tert-butanol [ml]	($NH_3 \cdot H_2O$) [ml][a]	Aging time [h]
M-8	8	10	0.072	10	0.8	21
M-9	9	10	0.072	10	0.8	21
M-10	10	10	0.072	10	0.8	21
M-11	11	10	0.072	10	0.8	21
M-12	12	10	0.072	10	0.8	21
M-13	13	10	0.072	10	0.8	21
M-14	14	10	0.072	10	0.8	21
M-15	15	10	0.072	10	0.8	21

[a](Ammonia concentration is 10M).

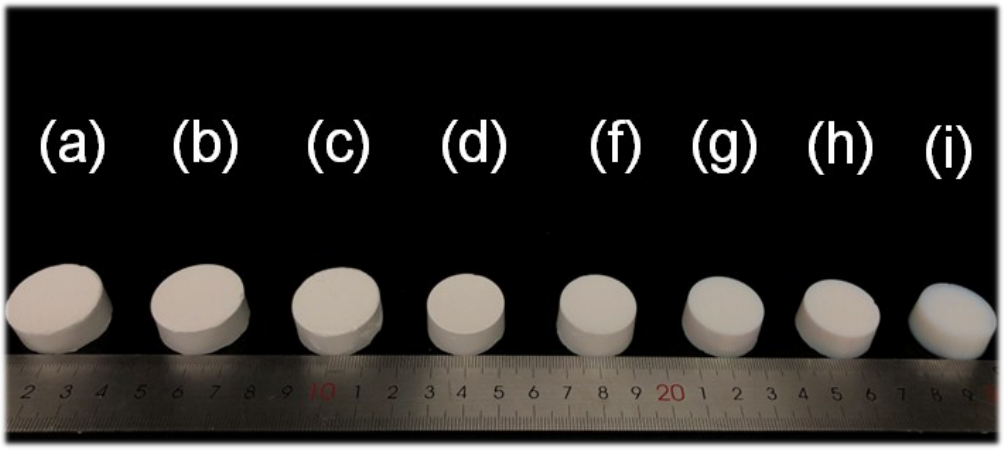

Fig. S1 silica aerogels with different MTMS molar ratio and supercritical drying: (a) M-8; (b) M-9; (c) M-10; (d) M-11; (e) M-12; (f) M-13; (g) M-14; (h) M-15.

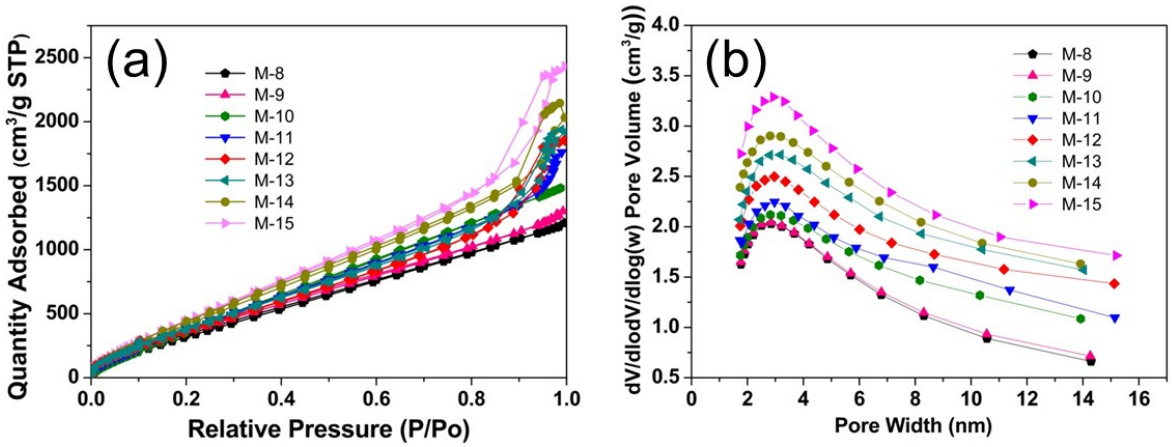

Fig. S2 (a) N_2 adsorption-desorption curve of SiO_2 aerogels with supercritical drying; (d) BJH pore size distribution curve calculated from the adsorption curve.

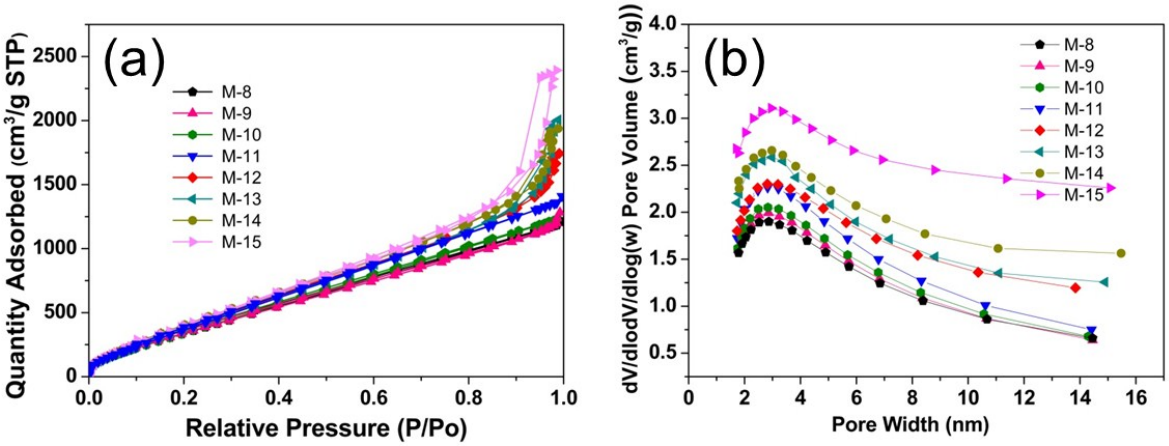

Fig. S3 (a) N_2 adsorption-desorption curve of SiO_2 aerogels with freeze drying; (d) BJH pore size distribution curve calculated from the adsorption curve.

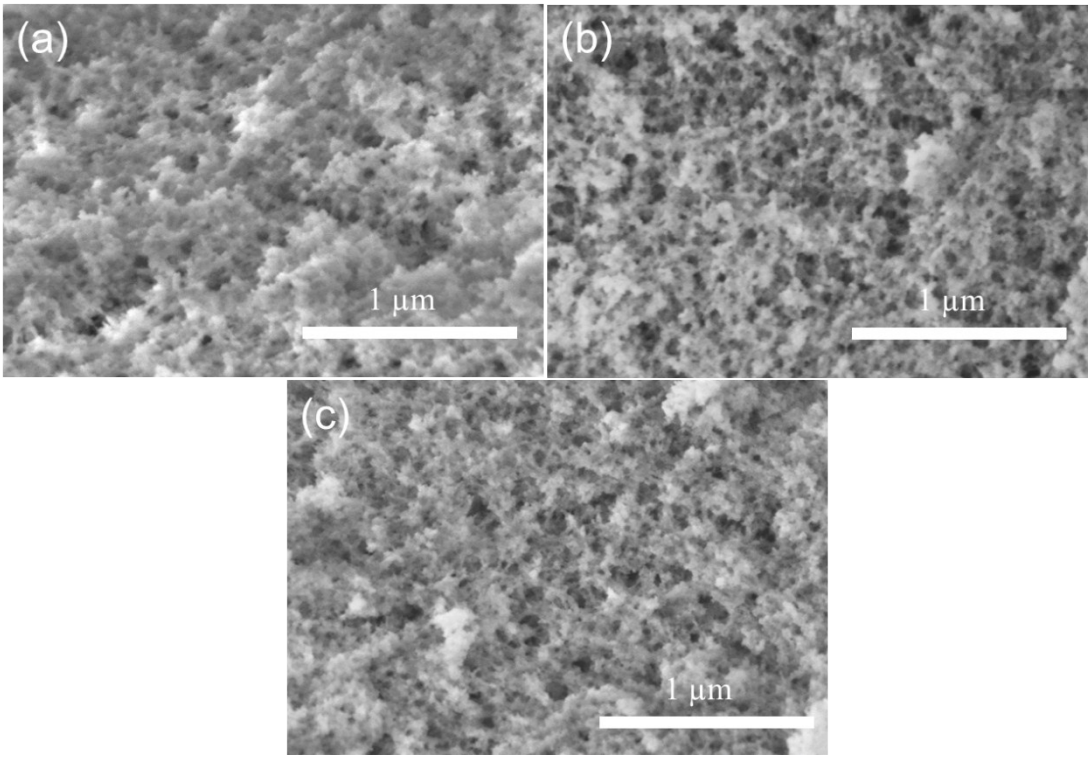

Fig. S4 SEM images of M-13 drying in different ways at same magnifications: (a) atmospheric drying; (b) freeze drying; (c) supercritical drying.

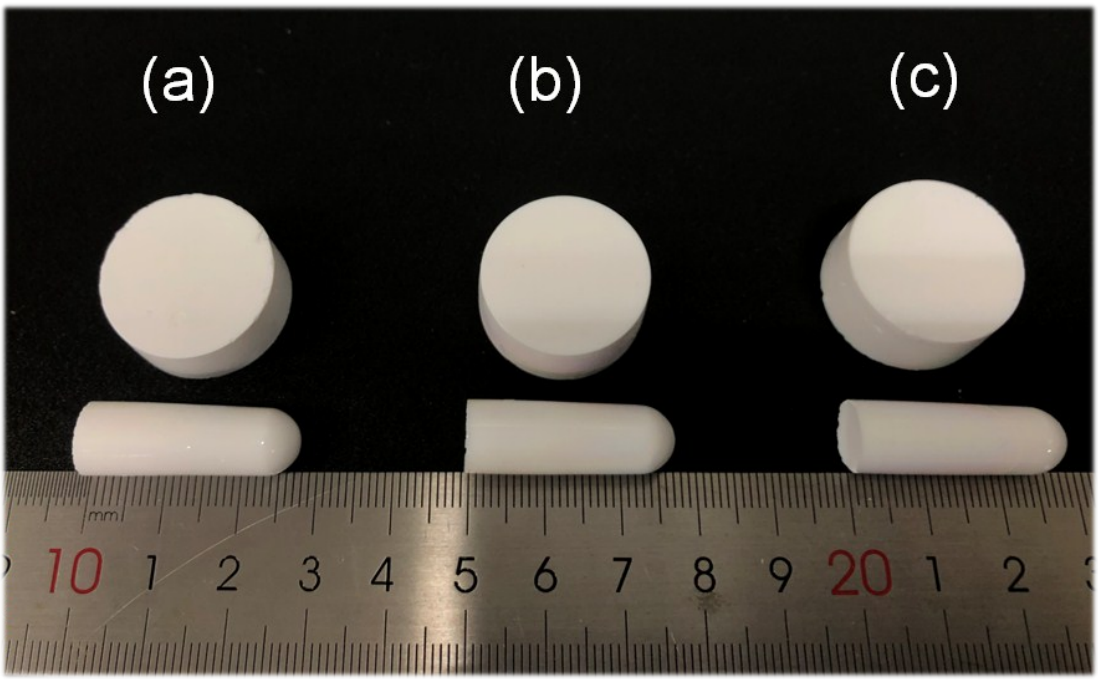

Fig. S5 Bulk samples of M-13 prepared by (a) atmospheric drying; (b) freeze drying; (c) supercritical drying.

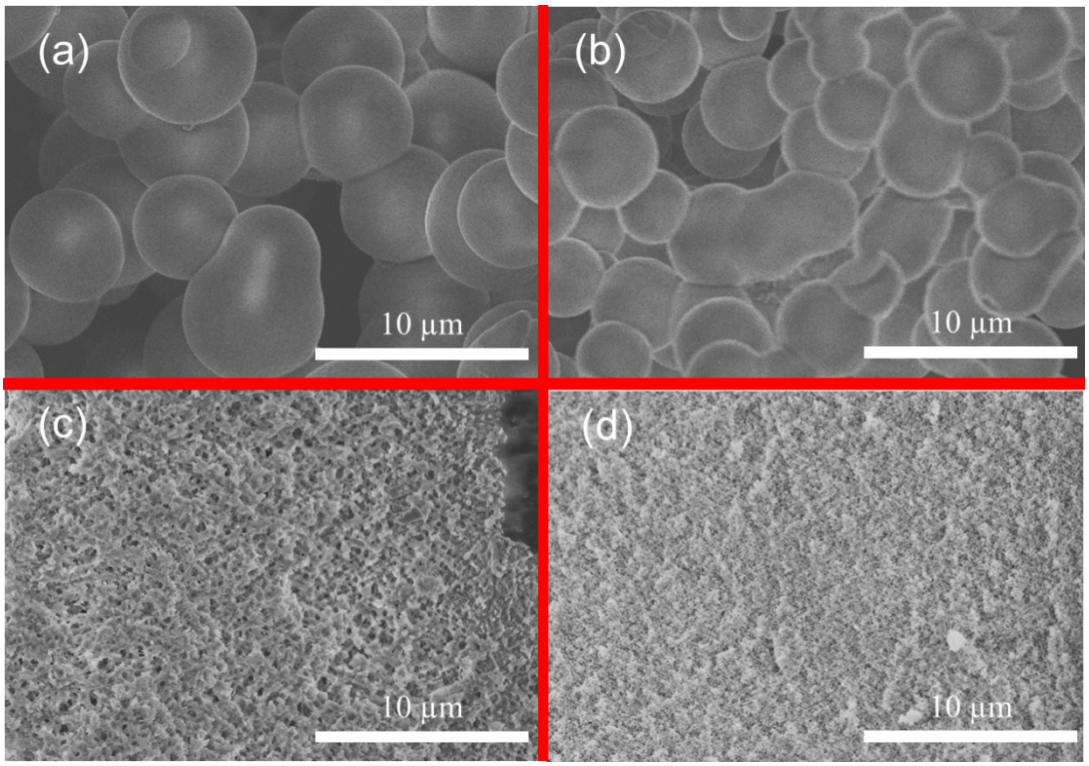

Fig. S6 SEM images of SiO_2 aerogels at same magnifications by atmospheric drying: (a) M-8; (b) M-10; (c) M-11; (d) M-12.

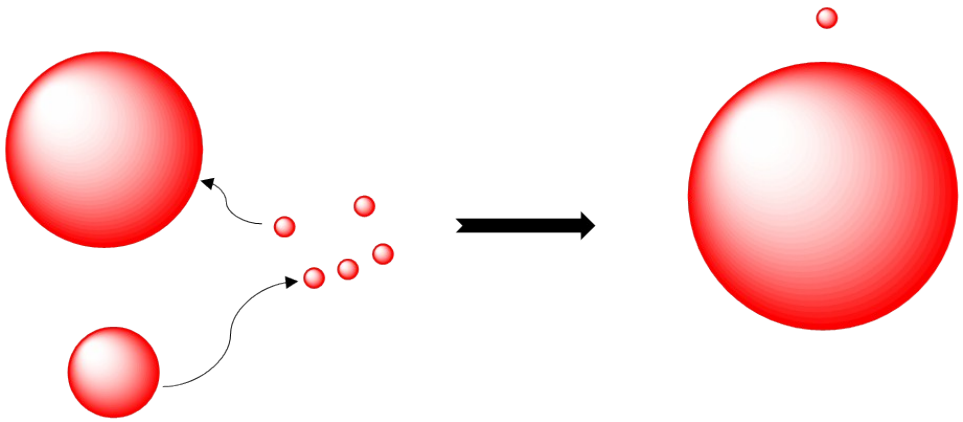

Fig. S7 Schematic illustration of oswald ripening process.

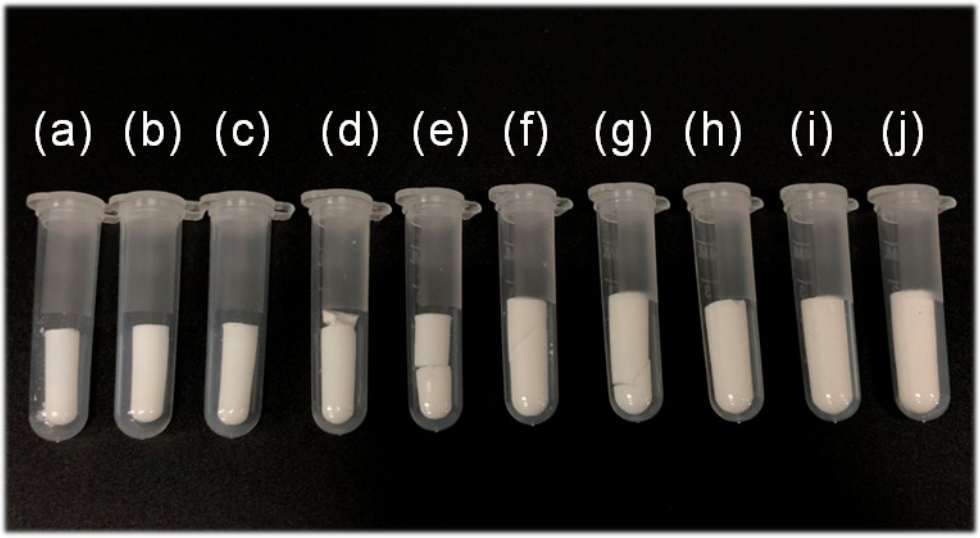

Fig. S8 Block samples of M-13 with atmospheric drying aged for (a) 2h; (b) 4h; (c) 6h; (d) 8h; (e) 10h; (f) 12h; (g) 15h; (h) 18h; (i) 21h; (j) 24h.

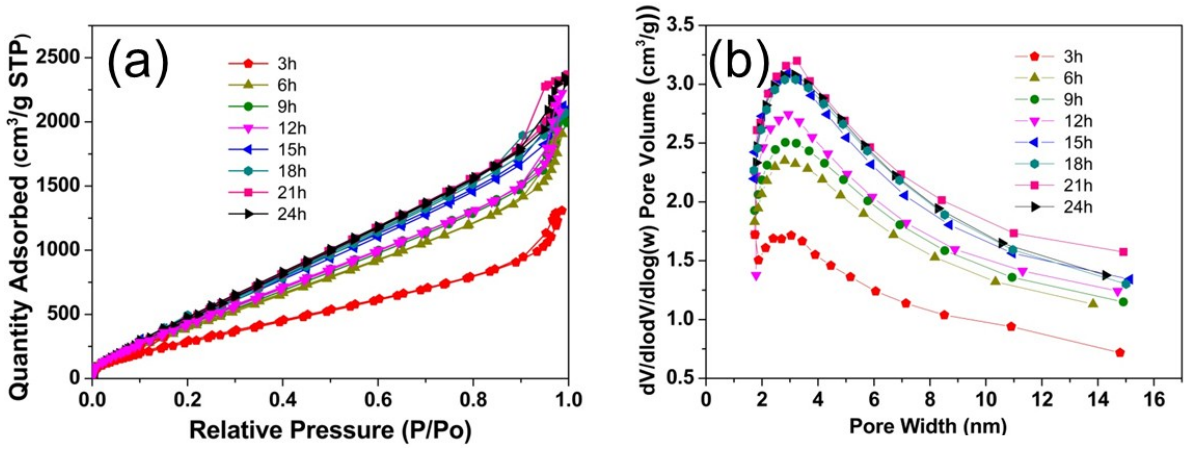

Fig. S9 (a) N_2 adsorption-desorption curve of M-13 with atmospheric drying under different aging time; (b) BJH pore size distribution curve calculated from the adsorption curve.

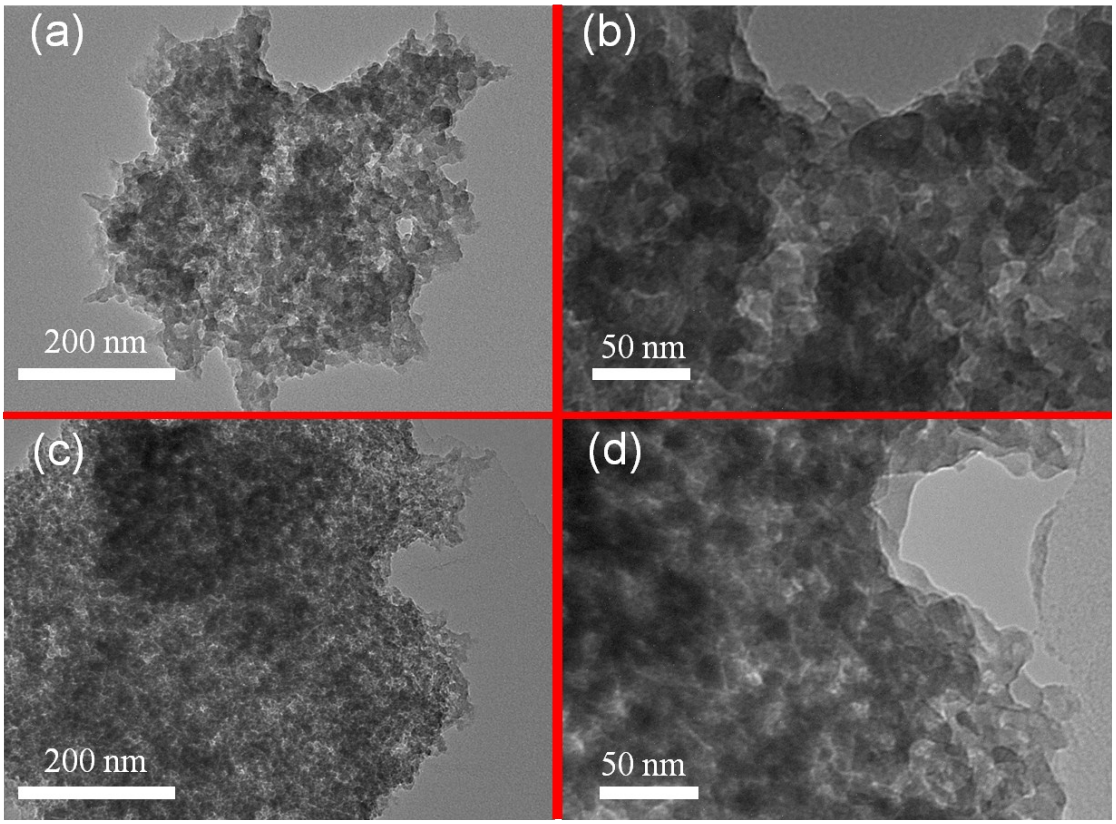

Fig. S10 TEM images of SiO_2 aerogels with atmospheric drying: (a, b) M-13; (c, d) M-15.

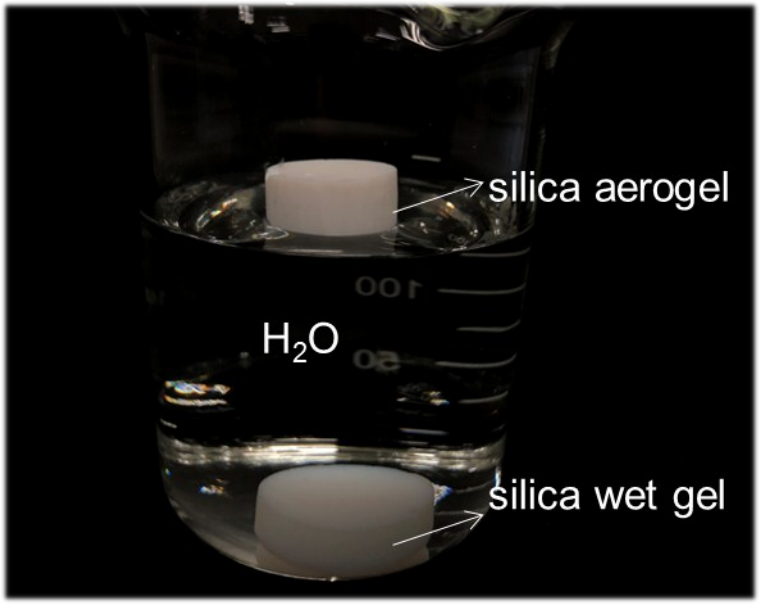

Fig. S11 Hydrophobic phenomenon of sample.

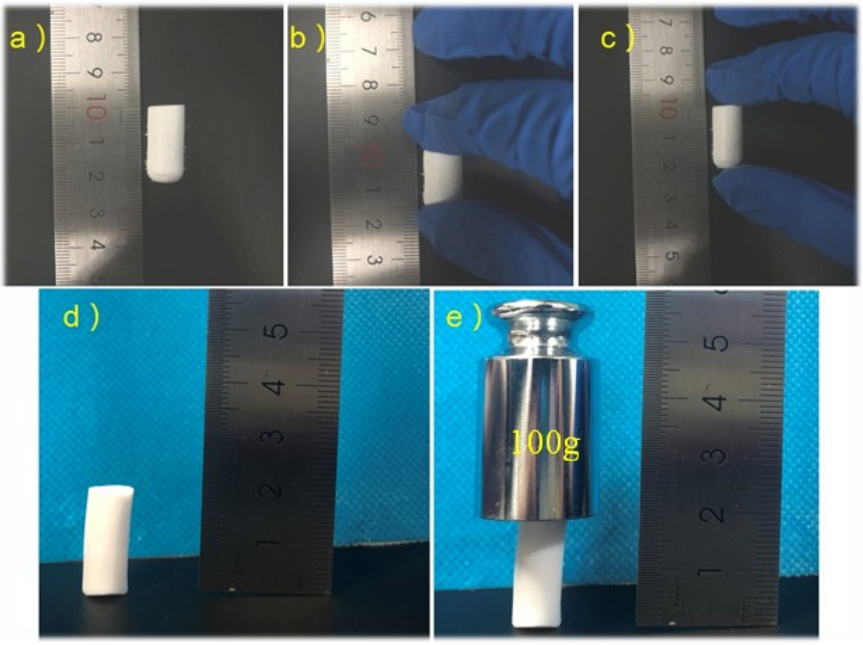

Fig. S12 Mechanical properties for SiO_2 aerogels with atmospheric drying: (a, b, c) M-9; (d, e) M-13.

Table S2 Bulk densities[b] of the samples M-8~15 dried via supercritical, freeze, atmospheric processes.

NO.	M-8	M-9	M-10	M-11	M-12	M-13	M-14	M-15
Supercritical	0.2177	0.2318	0.2561	0.2822	0.3051	0.3185	0.3407	0.3612
Freeze	0.2195	0.2352	0.2605	0.2863	0.3096	0.3206	0.3433	0.3657
Atmospheric	0.2185	0.2367	0.2589	0.2852	0.3088	03214	0.3425	0.3651

[b](Unit of density is g/cm^3).

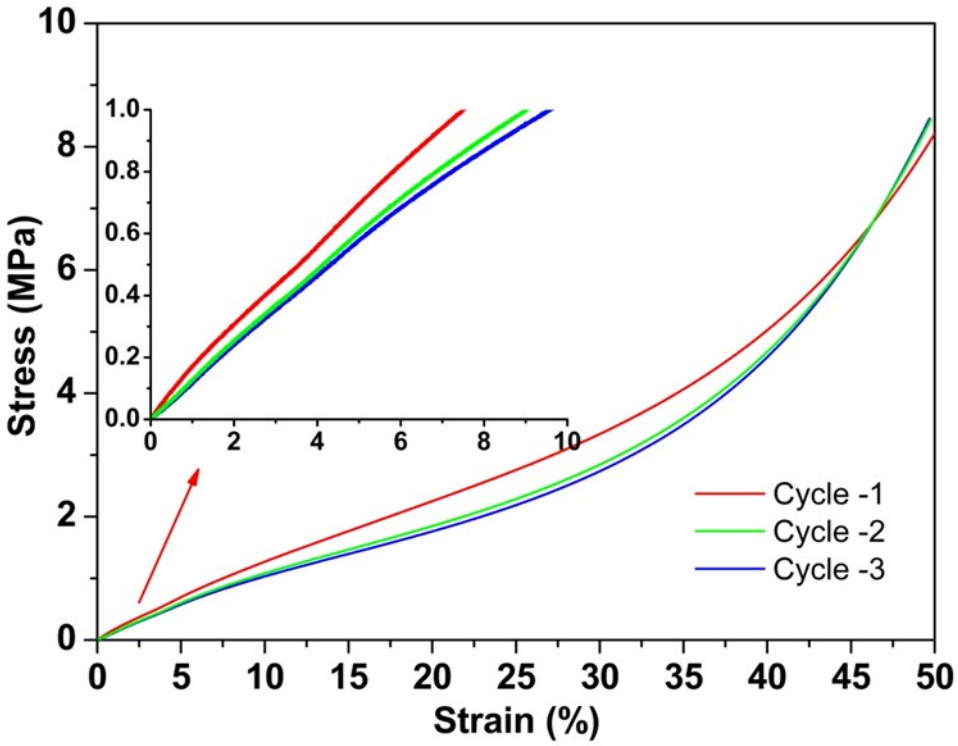

Fig. S13 Compression cycle of M-13 with atmospheric drying at 50% strain.