Electronic Supplementary Material (ESI) for RSC Advances.

Electronic Supplementary Information (ESI)

Mesoporous hollow carbons on graphene and their electrochemical property

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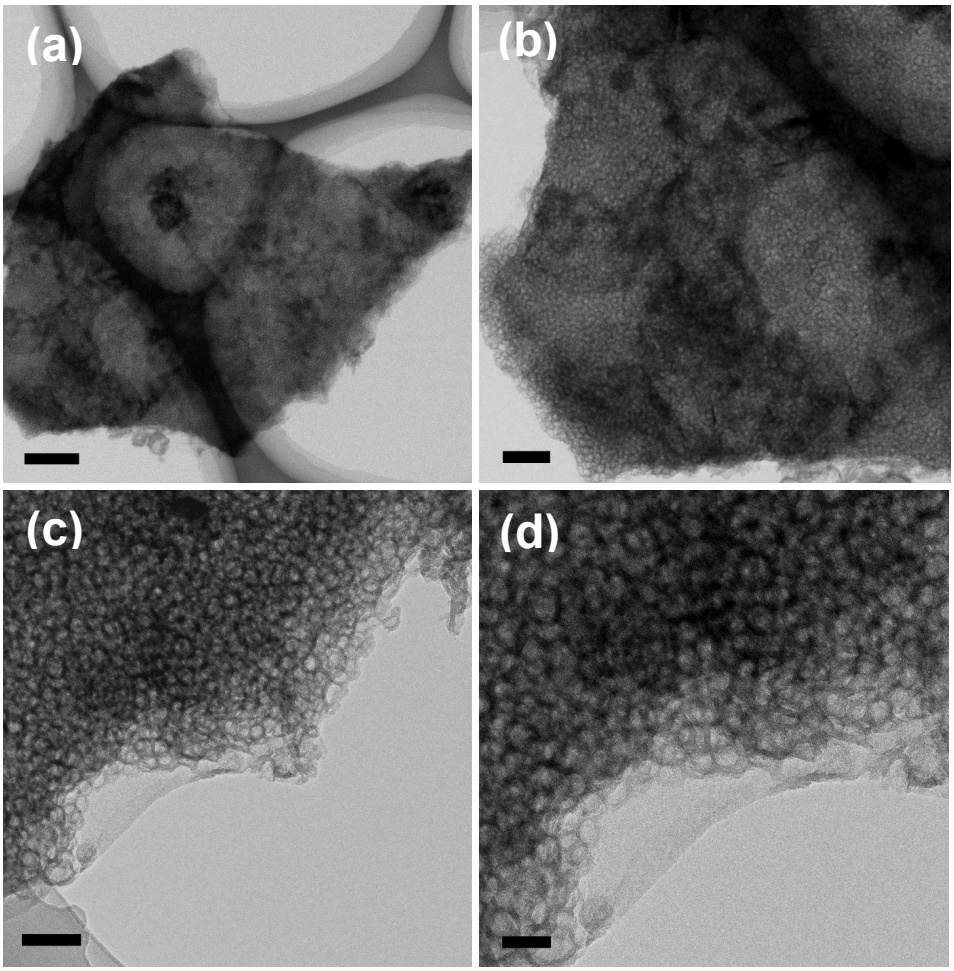

Fig. S1. TEM images of porous silica sheets on the graphene. The scale bar is 500 (a), 200 (b), 100 (c), and 50 nm (d), respectively.

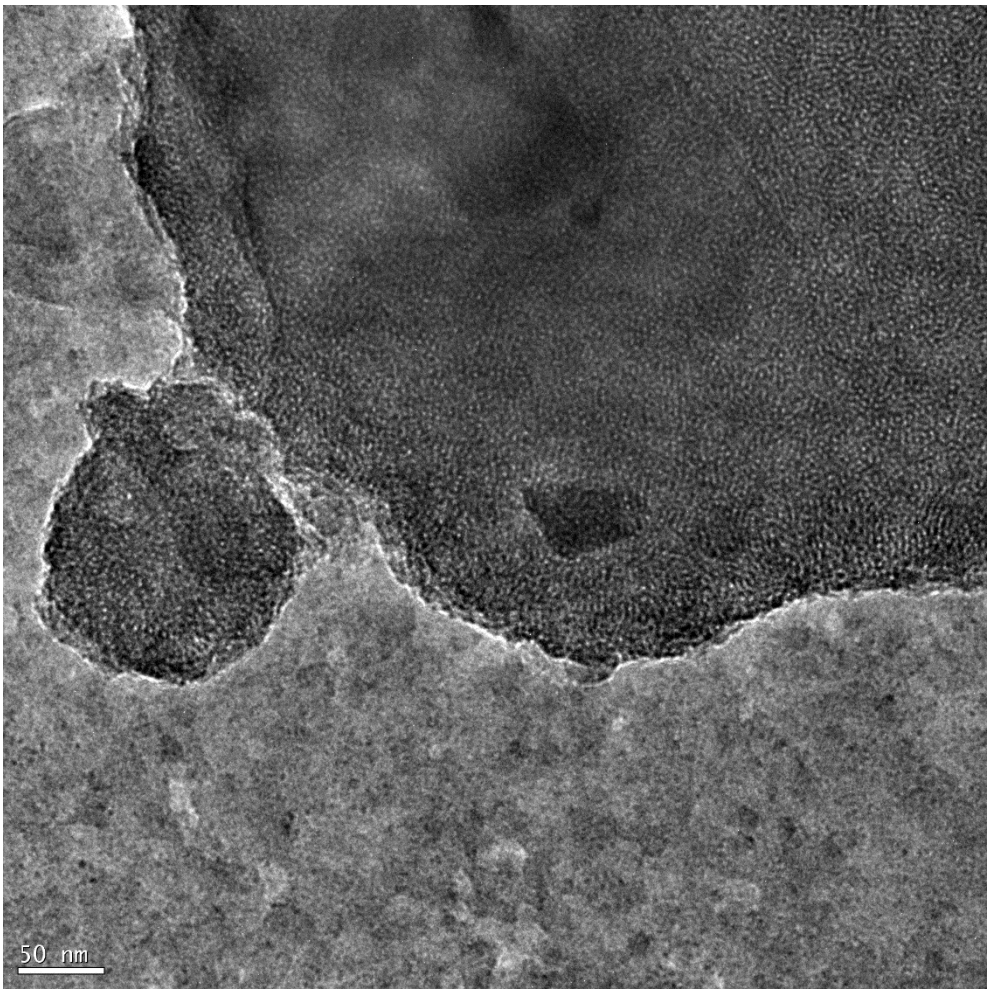

Fig. S2. TEM images of porous silica sheets on the graphene by CTAB as a surfactant.

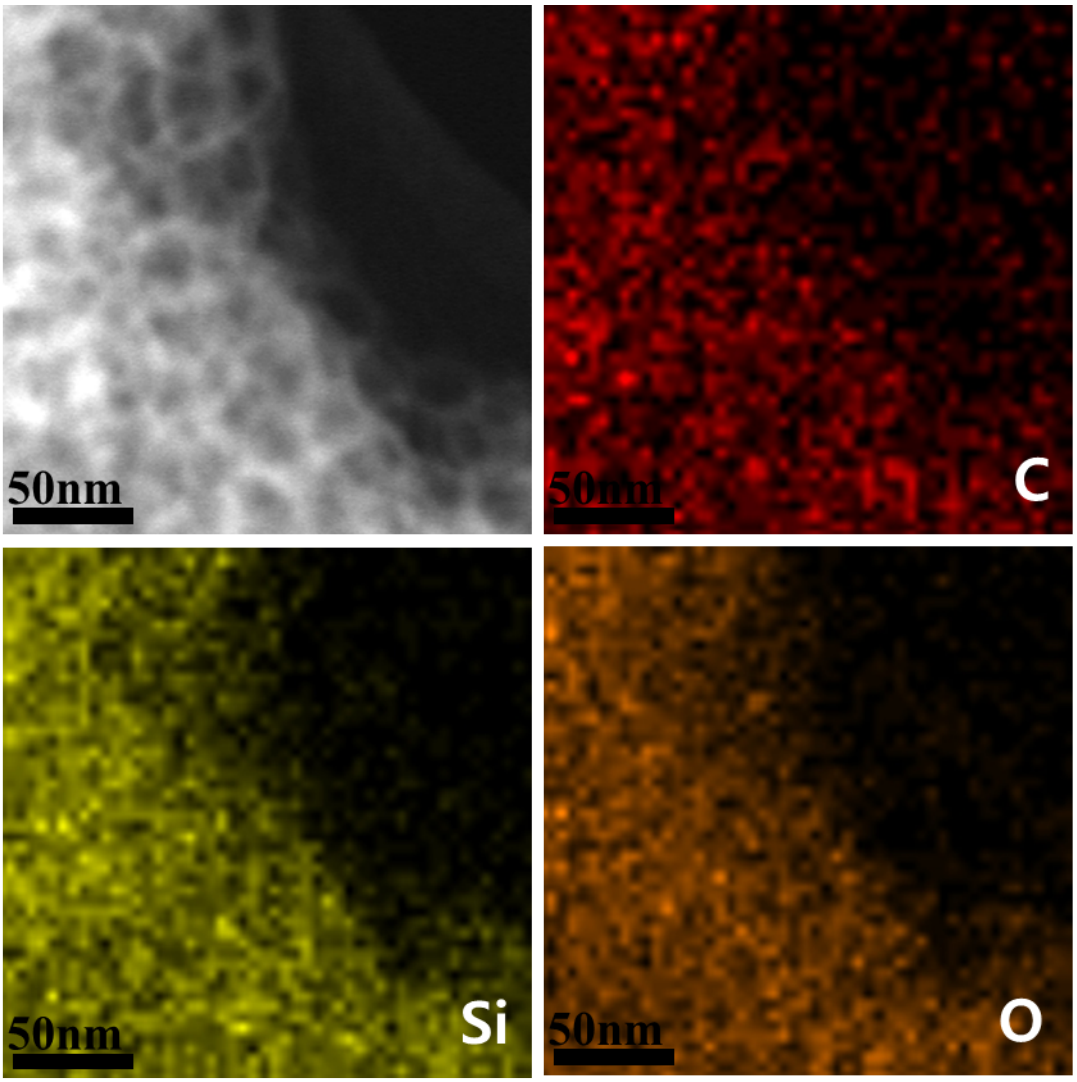

Fig. S3. HAADF-STEM mapping images of porous silica sheets on the graphene.

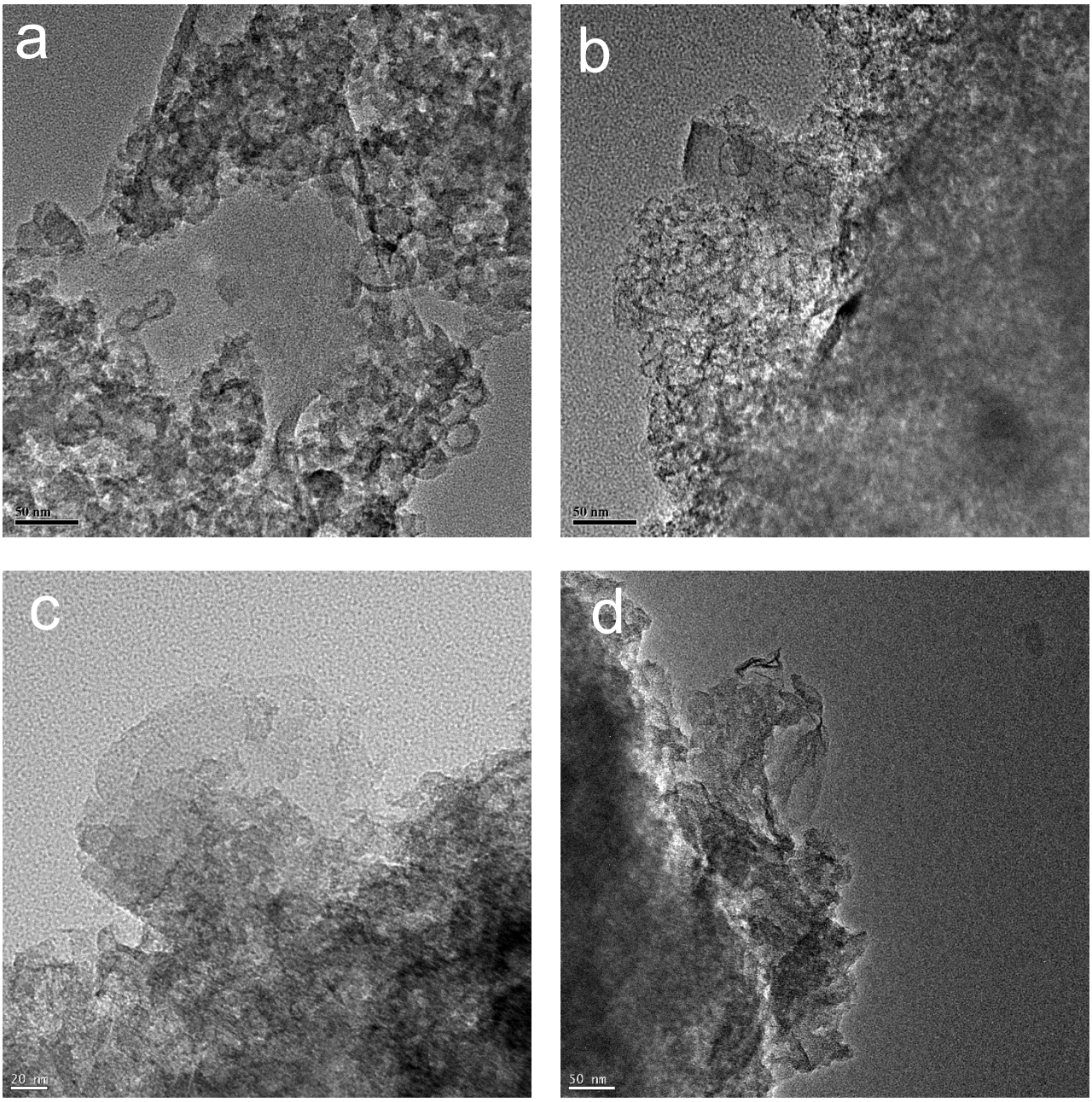

Fig. S4. Different conditions (a) adding 100 % amount of the template (b) 50 % amount of the template (c) at 750 C under N_2 (d) furfuryl alcohol as a carbon source instead of sucrose

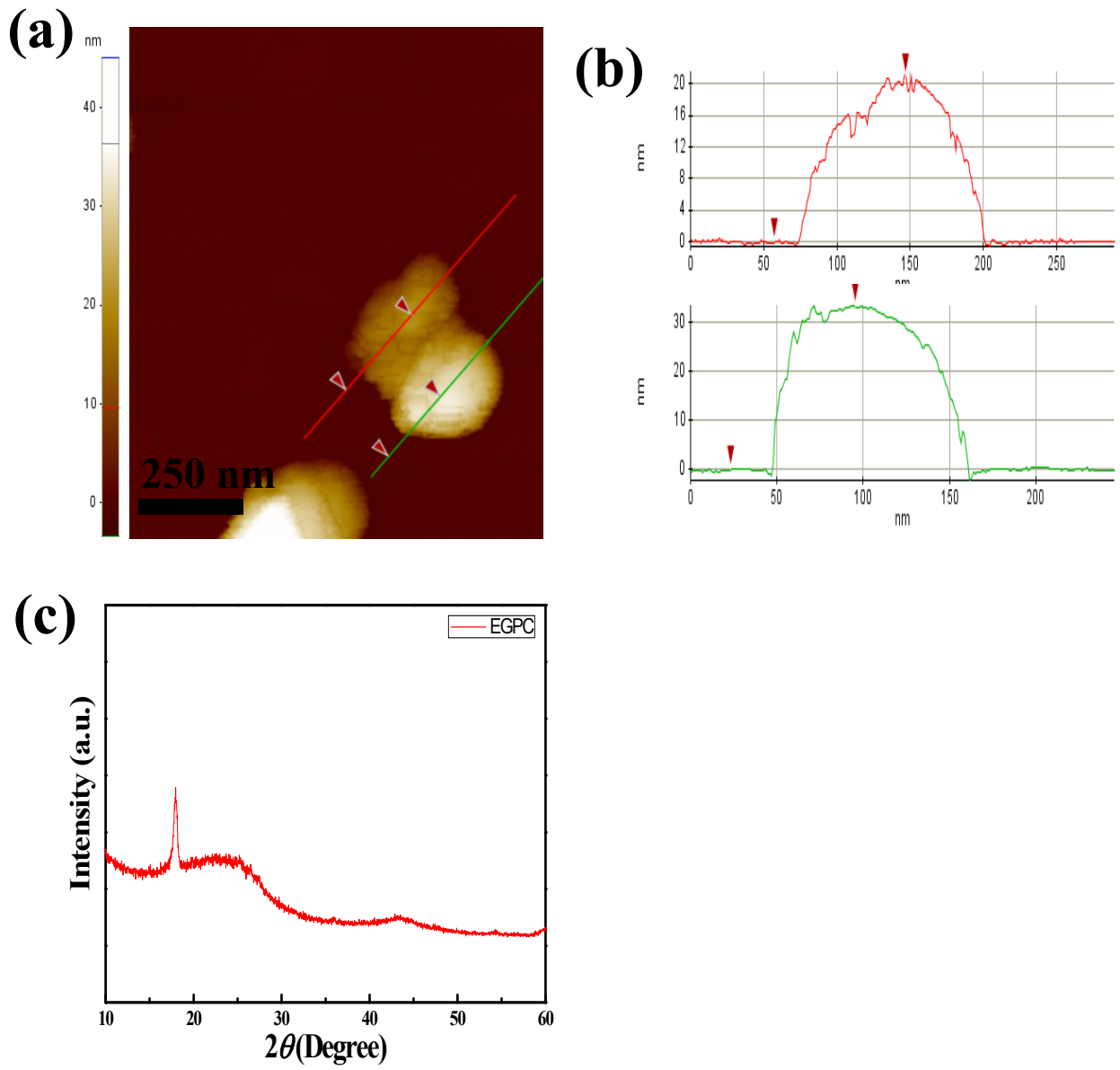

Fig. S5. (a) AFM topology (b) AFM line profiles of MHCG (C) XRD pattern of MHCG

Table S1. Best Fitting Results of Nyquist Spectra According to Change of Measuring Potential

V /V	R_b (Ω)	R_s (Ω)	Q_s (Ω)		τ_s (s)	T (Ω)		R_t (Ω)	τ_p (s)	C /F	$R_s+R_t/3$ (Ω)	ESR (Ω cm^2)
			Y_o	n		Y_o	B					
-0.1	0.34	3.94	2.4×10^{-4}	0.85	9.4×10^{-4}	0.39	0.41	1.05	0.17	0.16	4.29	4.63
0.2	0.34	3.7	1.9×10^{-4}	0.88	7.0×10^{-4}	0.65	0.6	0.92	0.36	0.39	4.01	4.35
0.3	0.34	3.62	1.4×10^{-4}	0.89	5.0×10^{-4}	0.84	0.79	0.94	0.63	0.67	3.93	4.27
0.5	0.35	3.47	1.0×10^{-4}	0.91	3.4×10^{-4}	0.52	0.37	0.71	0.14	0.20	3.71	4.06

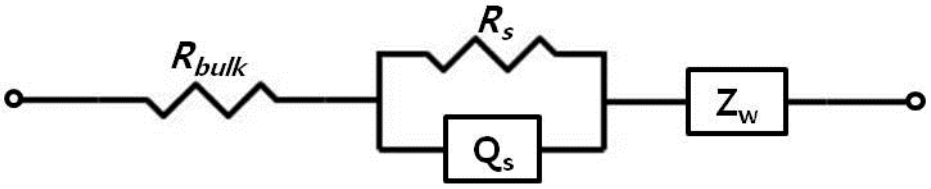

Fig. S6 Equivalent circuits for nonlinear least square fitting of EIS data.

Mathematical elements for NLLS fitting are given as follows;
Q(Ω), $j = \sqrt{-1}$, $\omega = 2\pi f$
For semicircle components;
Q_s;$Y^*(\omega) = Y_o(j\omega)^n$, $\tau = R_sC_s$
Here, Y(ω), Y_o, n and τ_s are frequency dependent admittance, magnitude of admittance and time constant of semicircle, respectively.

For hypercotantgent components;
T; $Y^*(\omega) = Y_o(j\omega)^{0.5} \tanh[B (j\omega)^{0.5}]$
$B = \tau_p^{0.5}$, $Y_o = B / R_t$
Here, τ_p and R_t are time constant for electrolyte in pores and total electrolyte resistance within pores, respectively.