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Electronic Supplementary Information

In-situ preparation of uniform SnO_2 nanocrystals anchored within mesoporous carbon network as advanced anode materials

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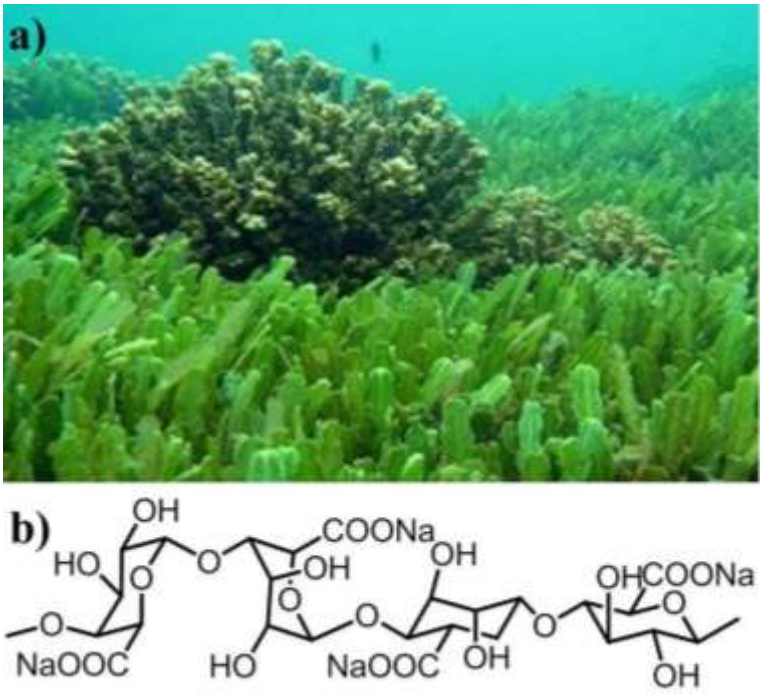


Fig. S1. a) Photograph of seaweeds. b) Chemical Structure of sodium alginate.

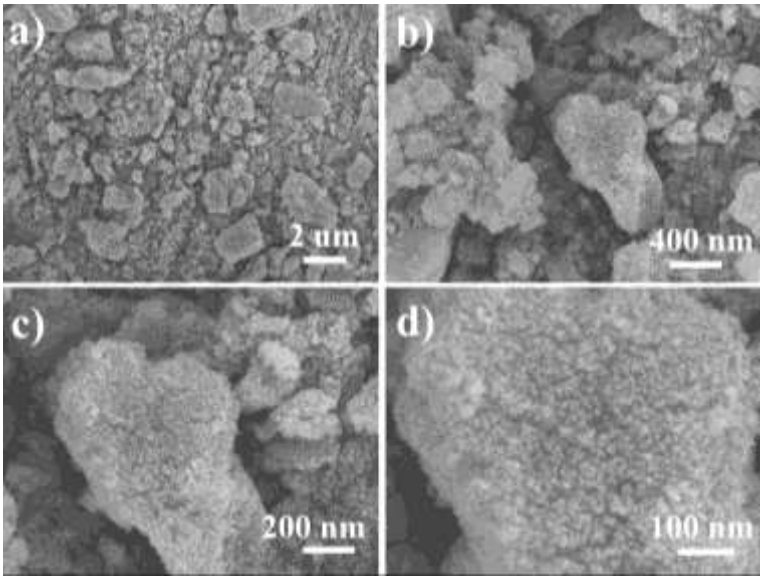


Fig. S2. SEM images of the SnO_2@SAMC composite with different magnifications: a) 2 um. b) 400 nm, c) 200 nm, d) 100 nm.

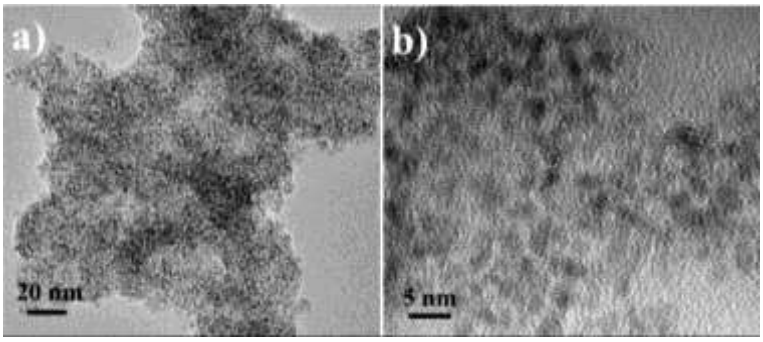


Fig. S3. Higher magnification TEM images of SnO_2@SAMC composite before calcination.

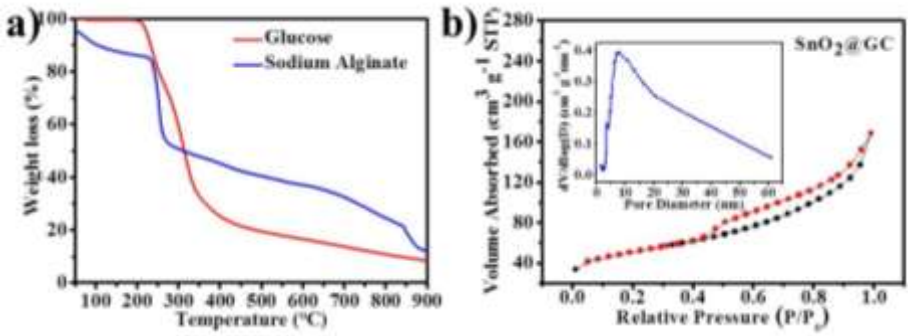


Fig. S4. a) Thermogravimetric analysis of sodium alginate and glucose under nitrogen atmosphere. Heating rate: 10°C min^{-1}. b) N_2 adsorption and desorption isotherms of SnO_2@GC composite, the inset shows the pore-size distribution.

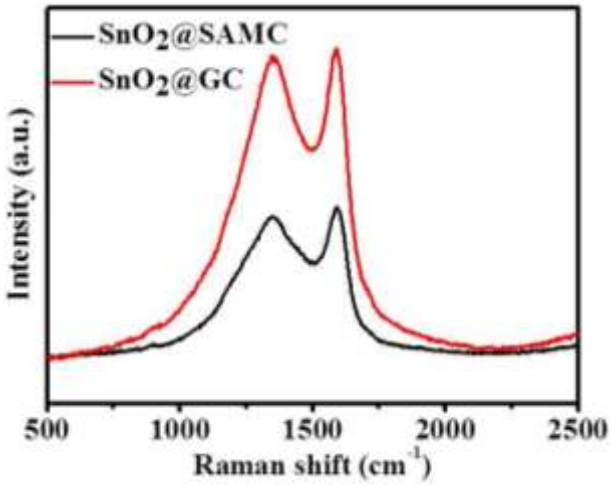
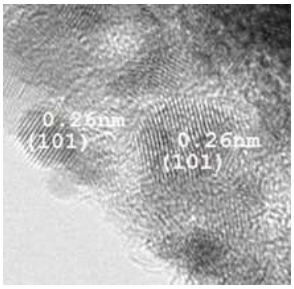
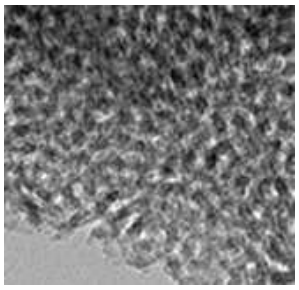
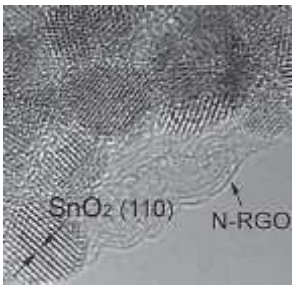
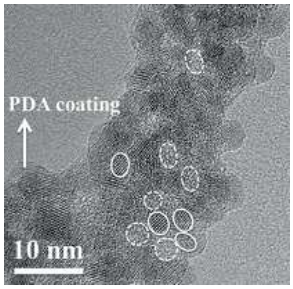
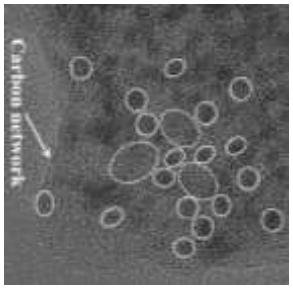


Fig. S5. Raman spectra for SnO_2@SAMC and SnO_2@GC composites.

Table S1. Comparison of synthesizing methods for confinement of 0D crystalline SnO_2 particles within carbonaceous materials

Materials	Methods	Reactants	Morphology	Particle Sizes	References
Sn/SnO_2 particles within mesoporous carbon	hard-template and liquid impregnation	mesoporous SBA-15; Pluronic P123; sucrose; HF; H_2SO_4; $SnCl_2{\cdot}2H_2O$; etc.		not reported	1
SnO_2 particles within micro/mesoporous carbon	soft-template and liquid impregnation	phloroglucinol; Pluronic F127; organic solvent; HCl; H_2O_2; $SnCl_4.5H_2O$; etc.		0.8-4 nm	2
SnO_2 particles within N-doped graphene sheets	freeze-drying and vapor reduction	$SnCl_4{\cdot}\ 5H_2O$; graphite oxide and hydrazine monohydrate.		4-5 nm	3
Polydopamine-coated SnO_2 particles	ATRP, hydrolysis, hydrothermal reaction and polydopamine coating;	Hydroxypropyl cellulose, $Na_2SnO_3{\cdot}3H_2O$, dopamine hydrochloride, etc.		average size of approximately 5 nm	4
SnO_2@SAMC	**ion exchange, hydrothermal and calcination**	**sodium alginate and $SnCl_2{\cdot}2H_2O$**		**2.2-3.8 nm**	**this work**

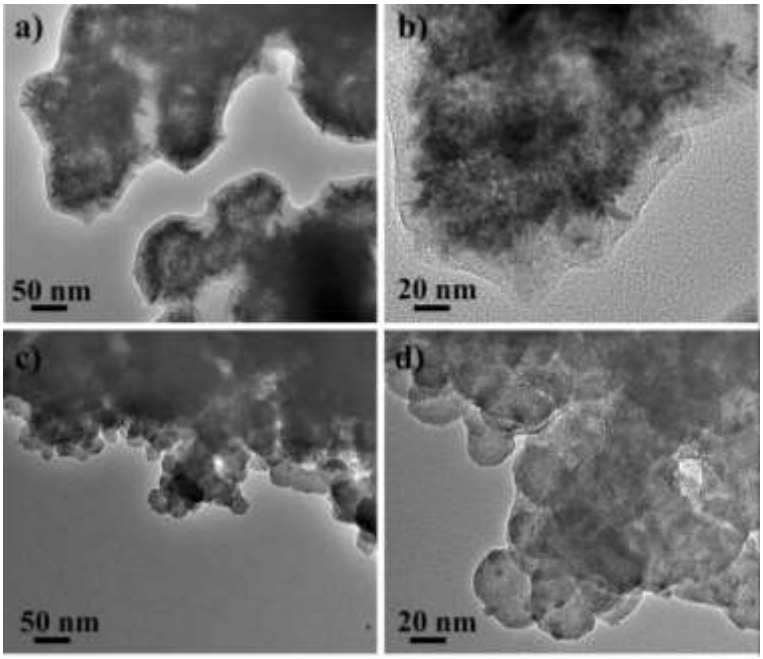


Fig. S6. TEM images of SnO_2@GC composite: a, b) Freshly prepared electrode before cycling with different magnification, and c, d) different magnification after cycling at 200 mA g^{-1} for 200 cycles.

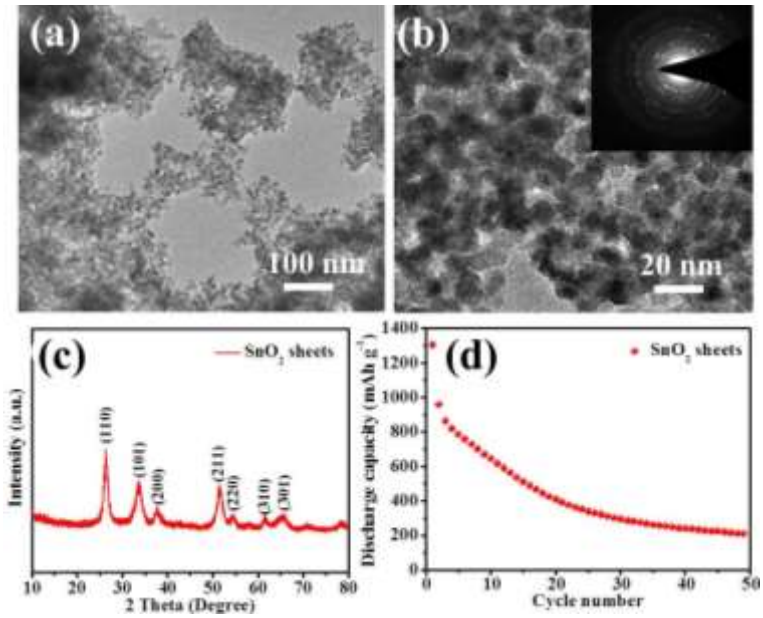


Fig. S7. a and b) TEM images of SnO_2 sheets, inset of b) shows the SAED. c) XRD pattern for SnO_2 sheets, d) Cycle performance at specific current of 200 mA g^{-1}.

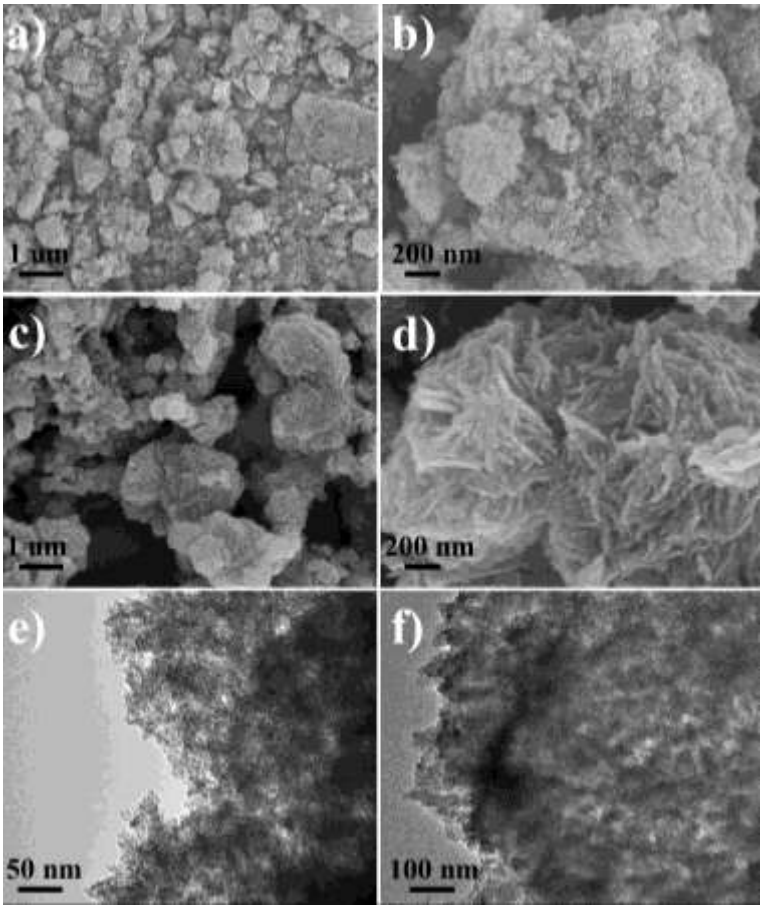


Fig. S8. SEM images of SnO_2@SAMC composite: a, b) Freshly prepared electrode before cycling with different magnification, and c, d) different magnification after cycling at 200 mA g^{-1} for 300 cycles. TEM images of SnO_2@SAMC composite: e) Freshly prepared electrode before cycling, and f) after cycling at 200 mA g^{-1} for 300 cycles.

References

1. H. M. Hassan , Z. W. Chen , A. P. Yu , Z. Chen and X. C. Xiao, *Electrochim. Acta*, 2013, **87,** 844-852.
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