Electronic Supplementary Material (ESI) for RSC Advances.

Investigation of soft carbon microstructure in silicon/carbon anodes for superior lithium storage

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Table S1. Elemental analysis of coal-based mesophase pitch.

C (wt%)	H (wt%)	N (wt%)	S (wt%)	H/C
95.26	3.80	0.85	0.16	0.479

Table S2. Typical properties of coal-based mesophase pitch.

Solubility (wt%)			Mesophase content	Softening point
TS	TI-PS	PI	(vol %)	(℃)
9.9	19.8	70.3	100	260-280

TS, toluene soluble. TI-PS, toluene insoluble-pyridine soluble. PI, pyridine insoluble.

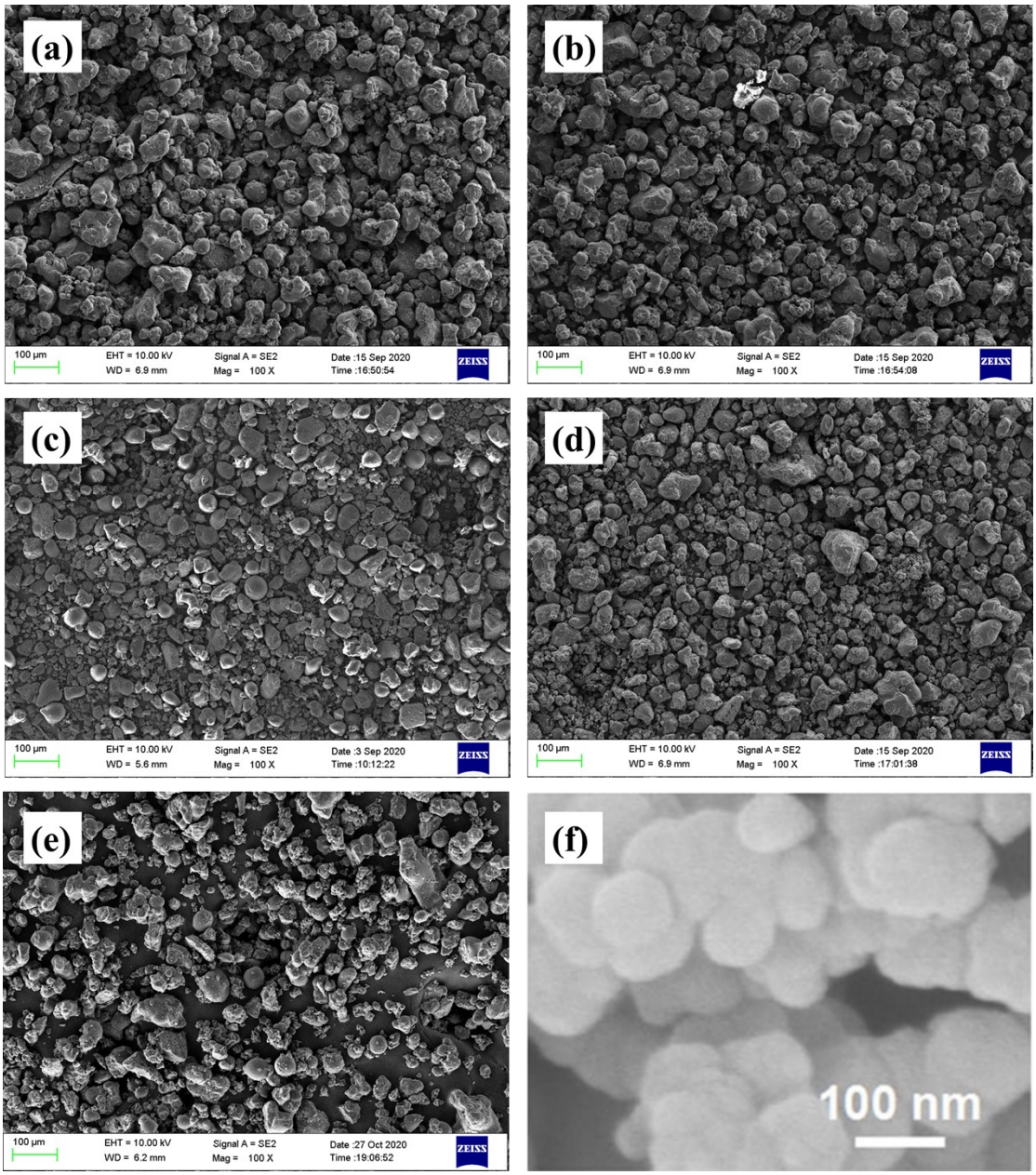

Fig.S1. SEM images of Si@MCMB-8 (a), Si@MCMB-10 (b), Si@MCMB-12 (c), Si@MCMB-13 (d), MCMB-12 (e), Nano-Si (f).

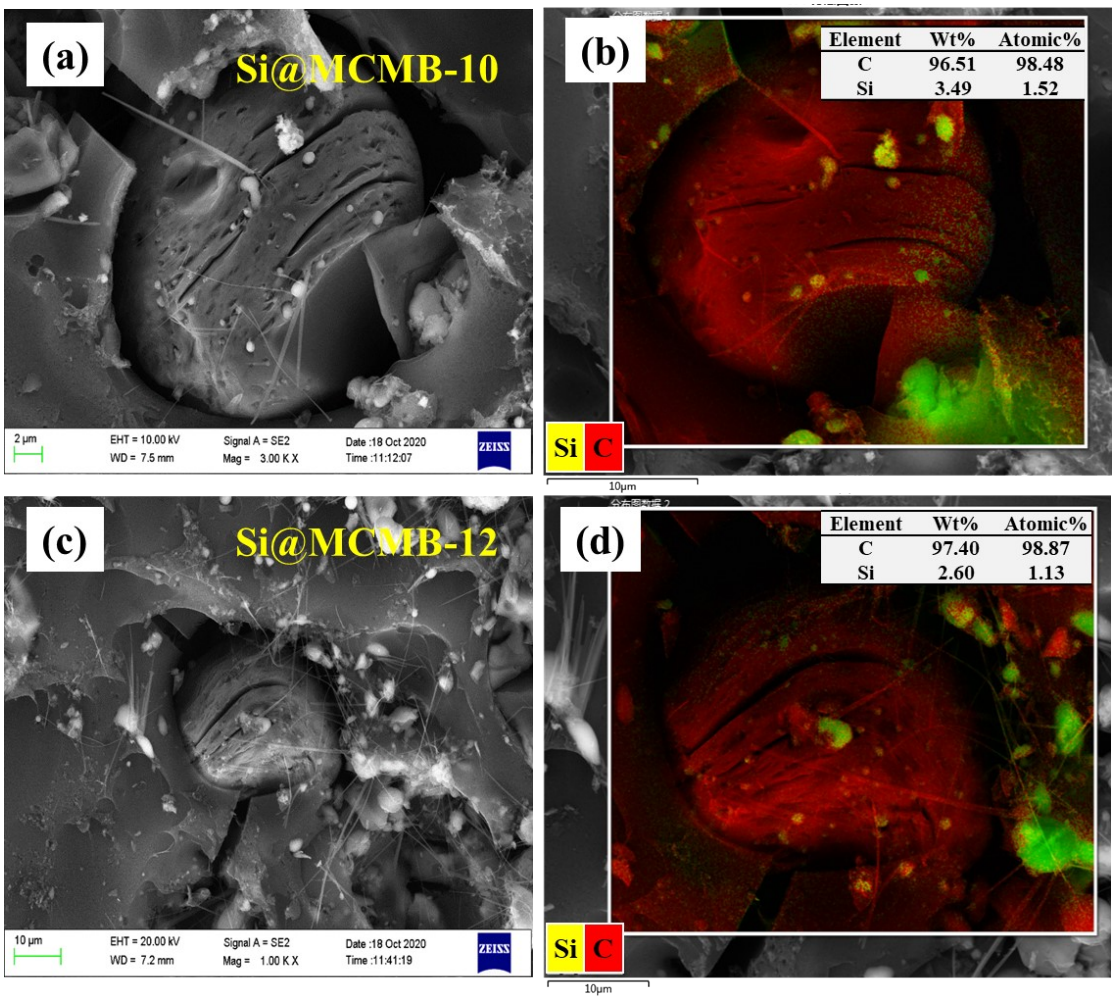

Fig.S2. SEM image (a, c) and EDS-mapping (b, d) of the cross sections of Si@MCMB-10 and Si@MCMB-12 composites. The inset in the EDS image shows the contents of Si and C in the Si@MCMB cross-section estimated by EDS.

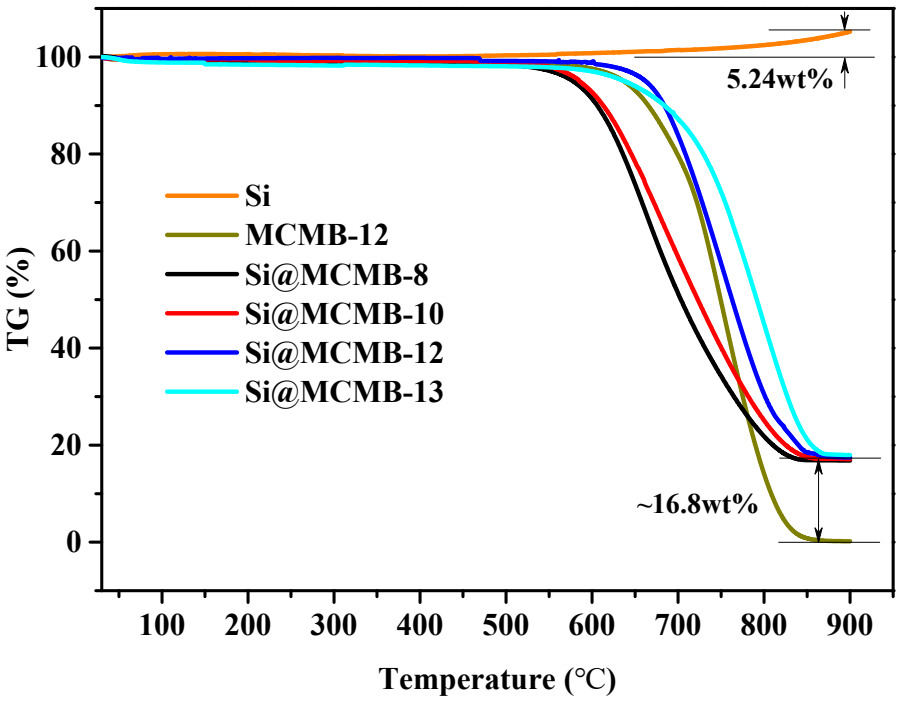

Fig.S3 Thermogravimetric analysis curve of Si@MCMB composites. The actual Si content was determined by TG analysis.

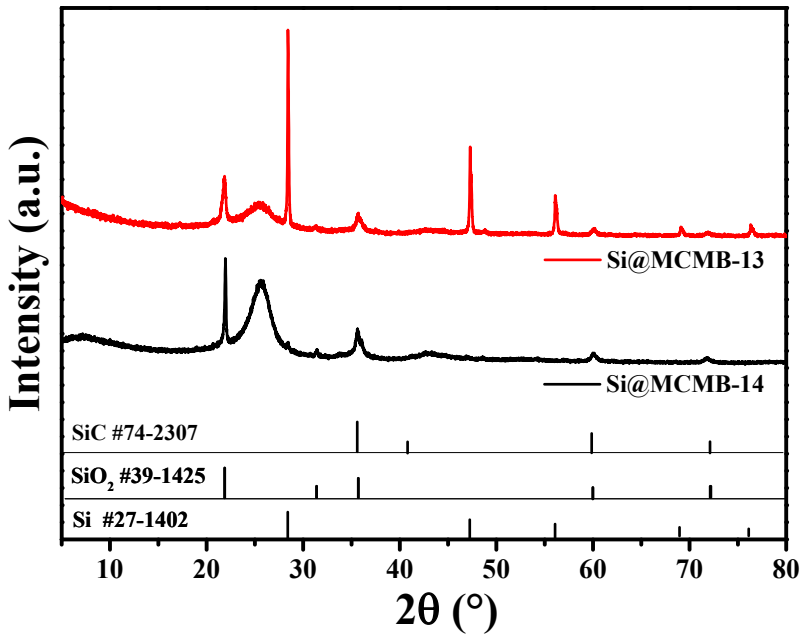

Fig.S4 XRD patterns of Si@MCMB-13 and Si@MCMB-14 composites

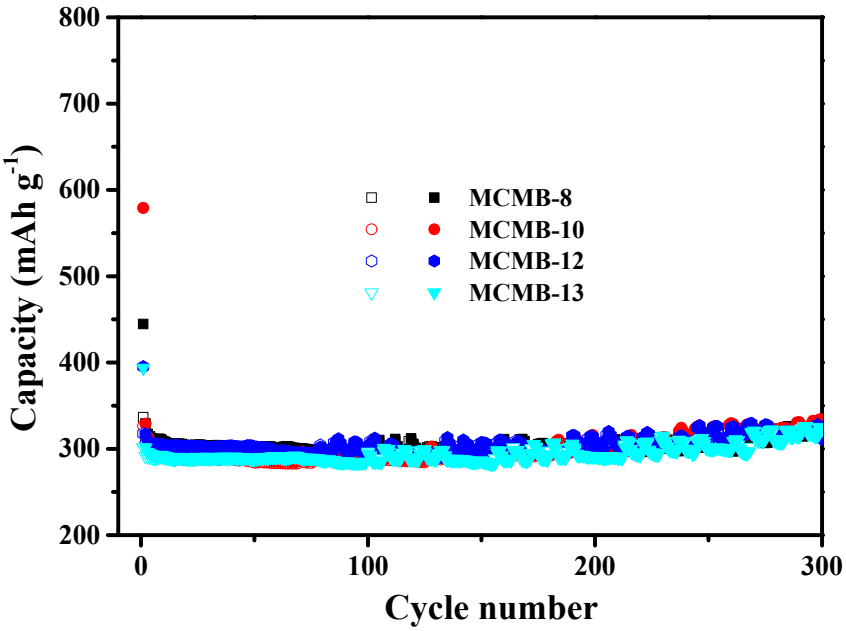

Fig.S5 Cycling performances of MCMBs at 0.2 Ag-1.

Table S3. Electrochemical performance data of MCMBs.

MCMB samples	800	1000	1200	1300
Reversible capacity (mAh g^{-1})	366.8	317.4	301.5	296.3
Irreversible capacity (mAh g^{-1})	126.1	100.6	92.2	88.2
ICE (%)	74.42	75.93	76.59	77.07

Table S4. Electrochemical performance data of MCMB and Si@MCMB anodes.

Samples	$R_e(\Omega)$	$R_{ct}(\Omega)$	$W(\Omega)$
MCMB-12	2.94	27.36	22.68
Si@MCMB-8	3.02	34.01	4.49
Si@MCMB-10	4.89	42.9	29.12
Si@MCMB-12	2.99	73.67	76.96
Si@MCMB-13	3.63	80.92	82.1
Si	5.26	100.7	140.8