

## Supplementary Information

### A novel sulfur-impregnated porous carbon matrix as a cathode material for a lithium sulfur battery

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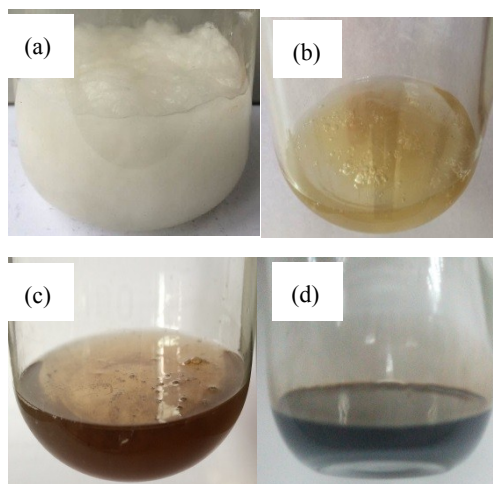


Fig.S1 The pre-carbonized process of PCM-Z: (a) After being stewed at 70°C for 24 h; (b) after heating at 65°C for 2 days; (c) after heating at 65°C for 4 days; (d) after heating at 65°C for 14 days

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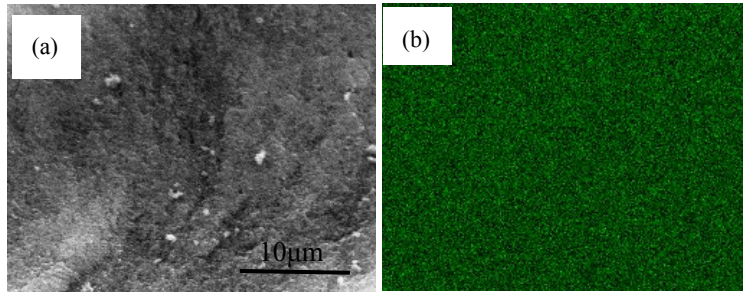


Fig. S2 (a) The SEM image of PCM-Z-S 58 wt% and EDX element mapping of (b) S (Green color dots)

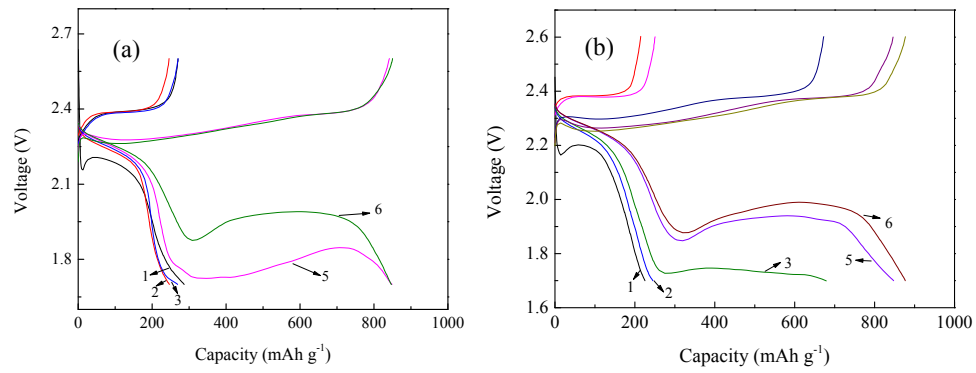


Fig. S3 The discharge-charge curves of PCM-Z-S 58 wt% composite with different deposited time at 1C: (a) 1 day and (b) 8 days

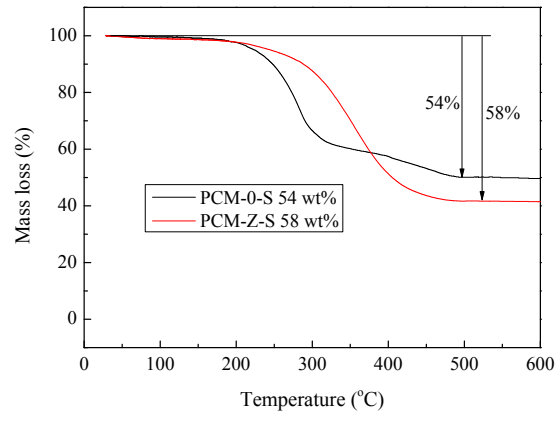


Fig. S4 The Tg analysis of PCM-0-S 54 wt% and PCM-Z-S 58 wt% composite

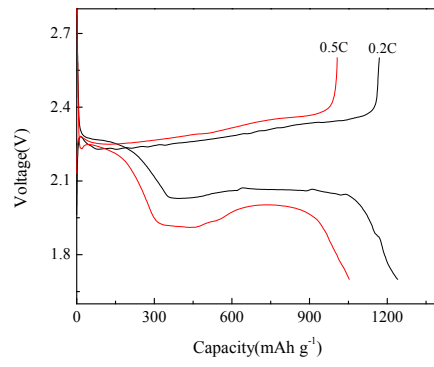


Fig. S5 The first discharge and charge curves, of PCM-Z-S 58 wt% at 0.2C and 0.5C

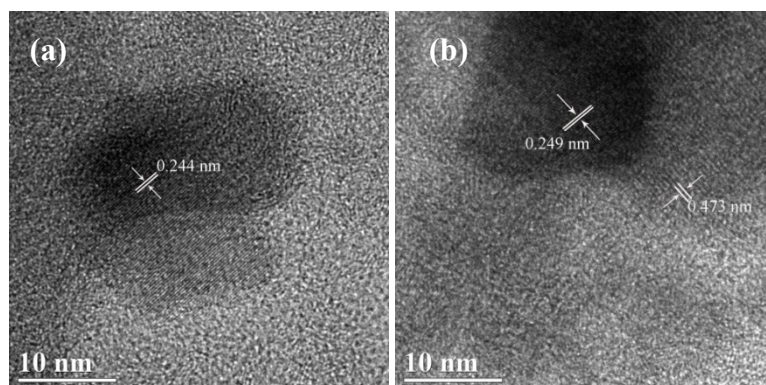


Fig. S6 High resolution images of (a) PCM-Z and (b) PCM-Z-S 58 wt% composite

Table S1 Calculated total surface area ( $\text{m}^2 \text{g}^{-1}$ ), total pore volume ( $\text{cm}^3 \text{g}^{-1}$ ), and average pore radius (nm) for PCM-0, PCM-0-S 54 wt%, PCM-Z and PCM-Z-S 58 wt%

Materials	Surface area	Pore volume	Average pore radius
PCM-0	448	0.026	1.8
PCM-0-S 54 wt%	35	--	--
PCM-Z	1056	1.75	1.8
PCM-Z-S 58 wt%	153	0.50	4.75