

## Electronic Supplementary Information

# Na-X Zeolite Templated and Sulfur-impregnated Porous Carbon as Cathode for High-performance Li-S Battery

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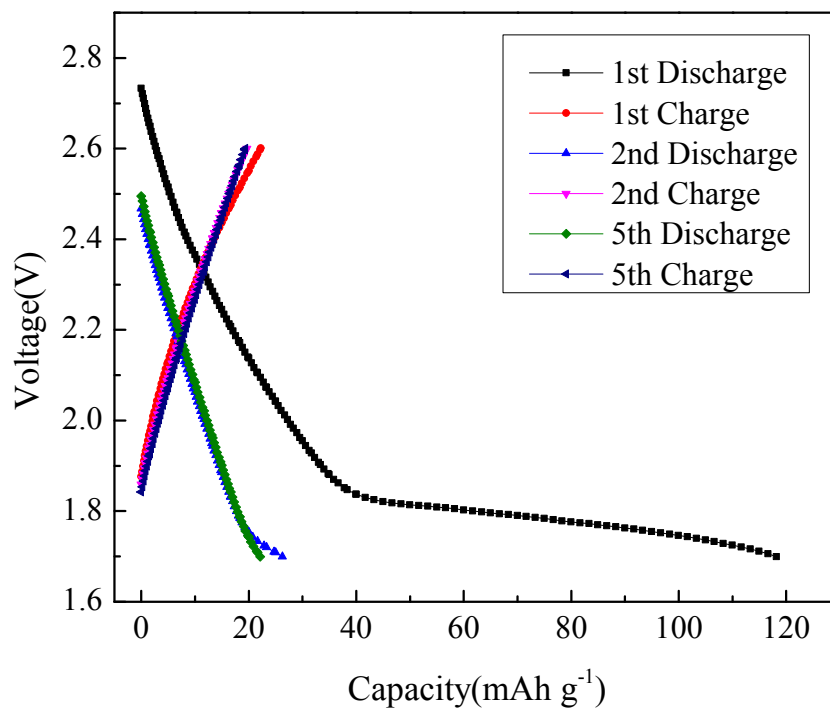


Fig. S1 The charge and discharge curves of the A-ZPC

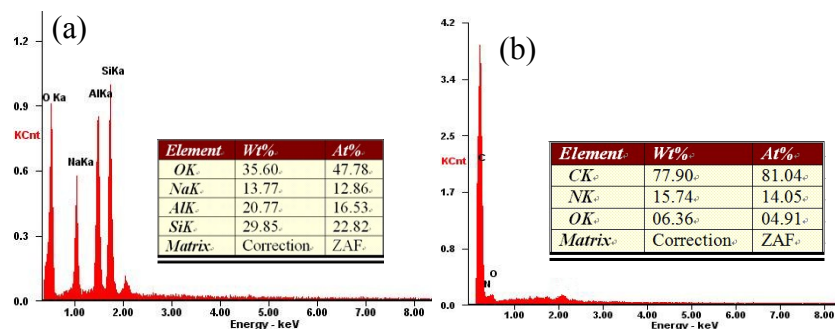


Fig. S2 The EDS spectrum of (a) nano Na-X zeolite and (b) A-ZPC

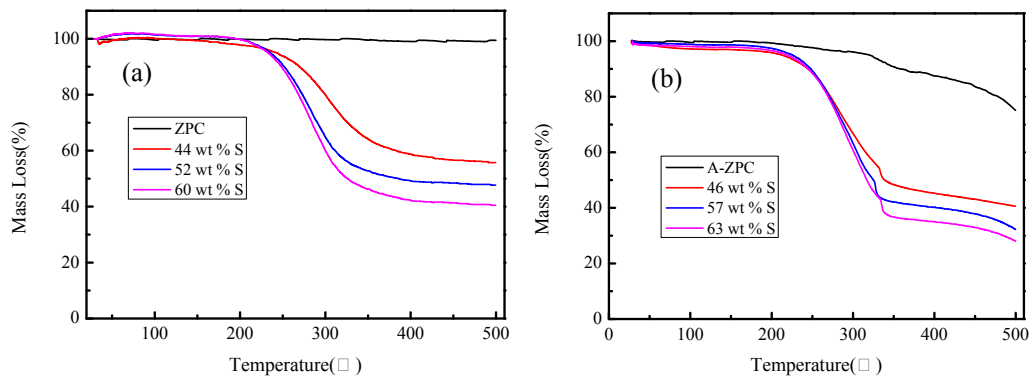


Fig. S3 The TG analysis of ZPC and ZPC-S composite (a) and A-ZPC and the A-ZPC-S composite (b)

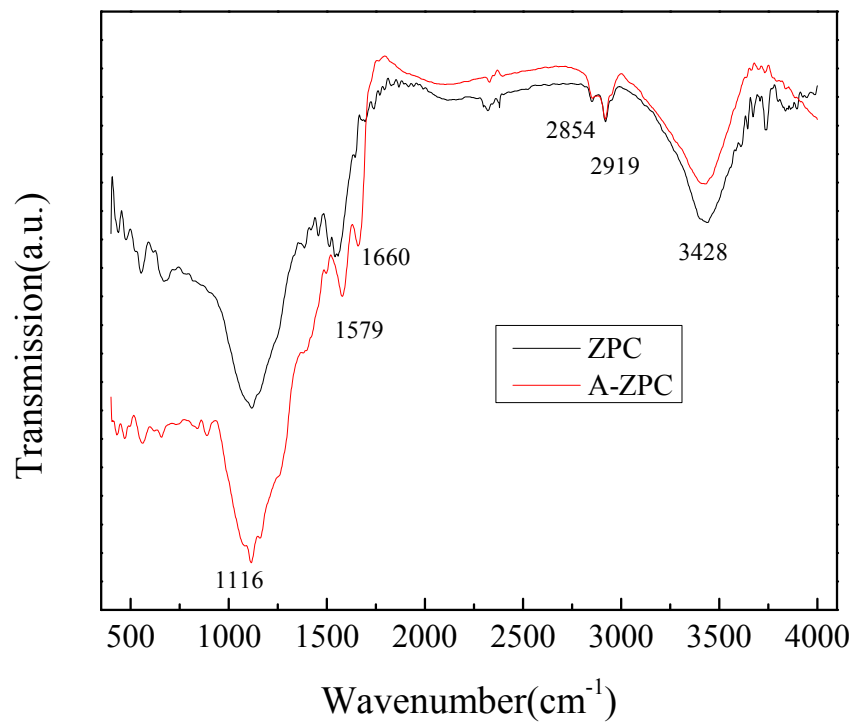


Fig. S4 The FTIR spectrum of ZPC and A-ZPC

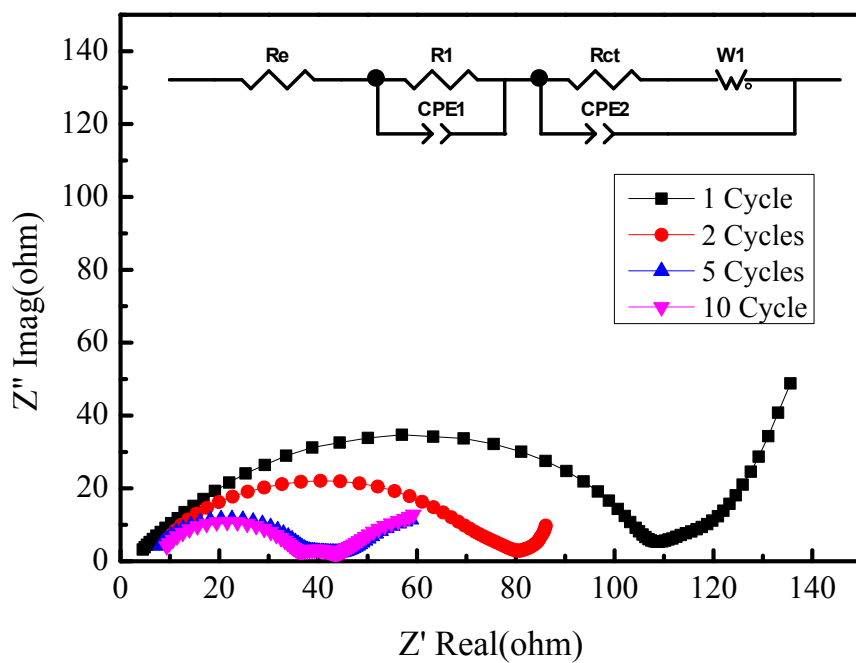


Fig. S5 Electrochemical impedance spectrum of A-ZPC-S composite with 63 wt% sulfur loading after different cycles at 0.2C

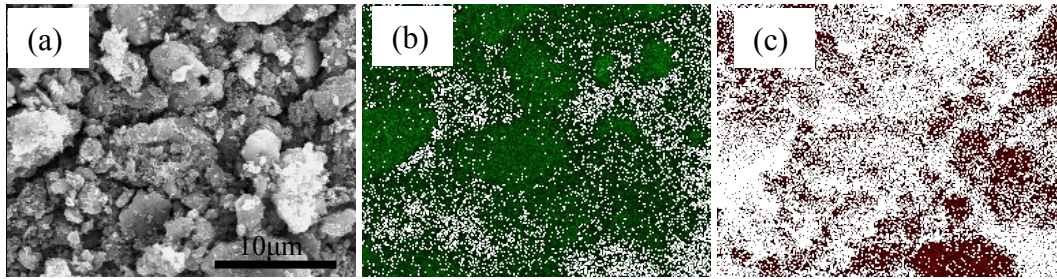


Fig. S6 The SEM image (a) of as-prepared A-ZPC-S composite with 46 wt% S and EDX element mappings of S (b) and C (c)

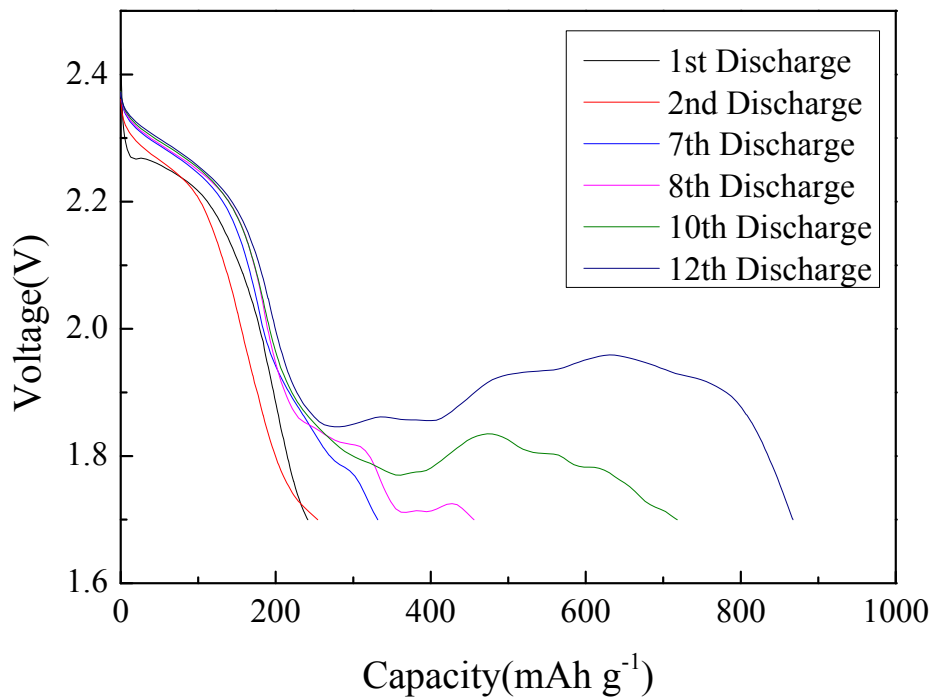


Fig. S7 The discharge curves of A-ZPC-S composite with 63 wt% S content at 0.5C between 1.7V and 2.6V

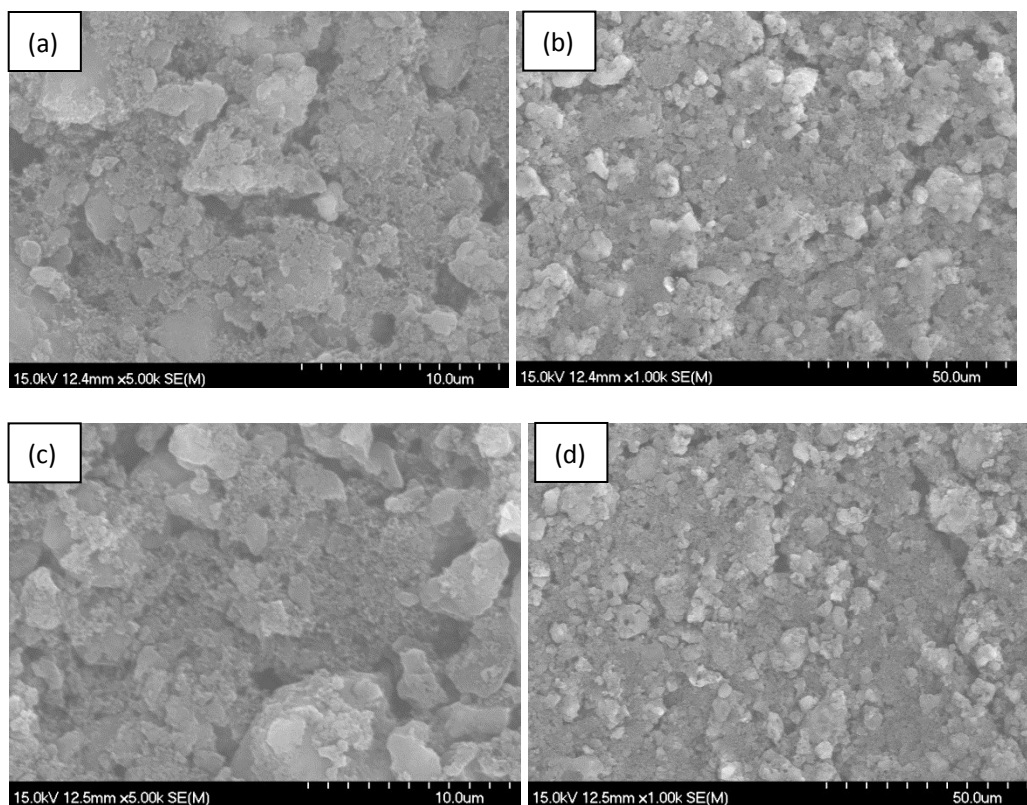


Fig. S8 SEM images of A-ZPC-S composite with 46 wt% S cathode (a)(b) before cycling and (c)(d) the cathode after 300 cycles at 1C

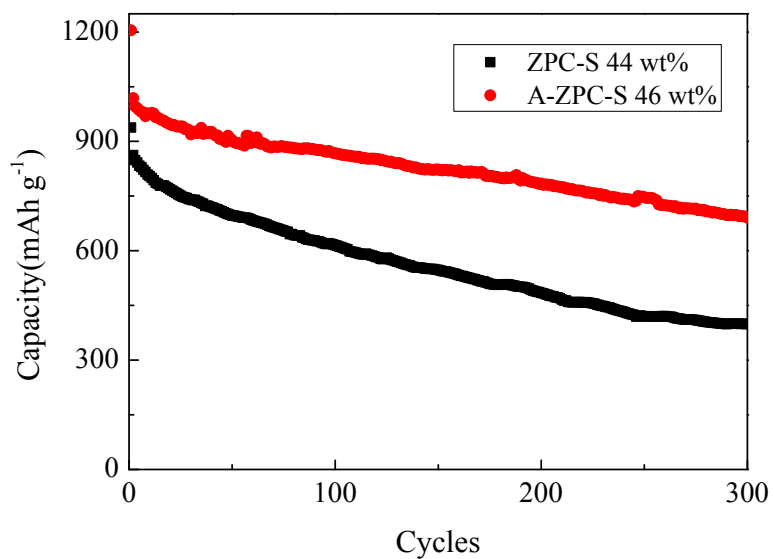


Fig. S9 The cycling performance of ZPC-S 44 wt% S and A-ZPC-S 46 wt% S at 1C

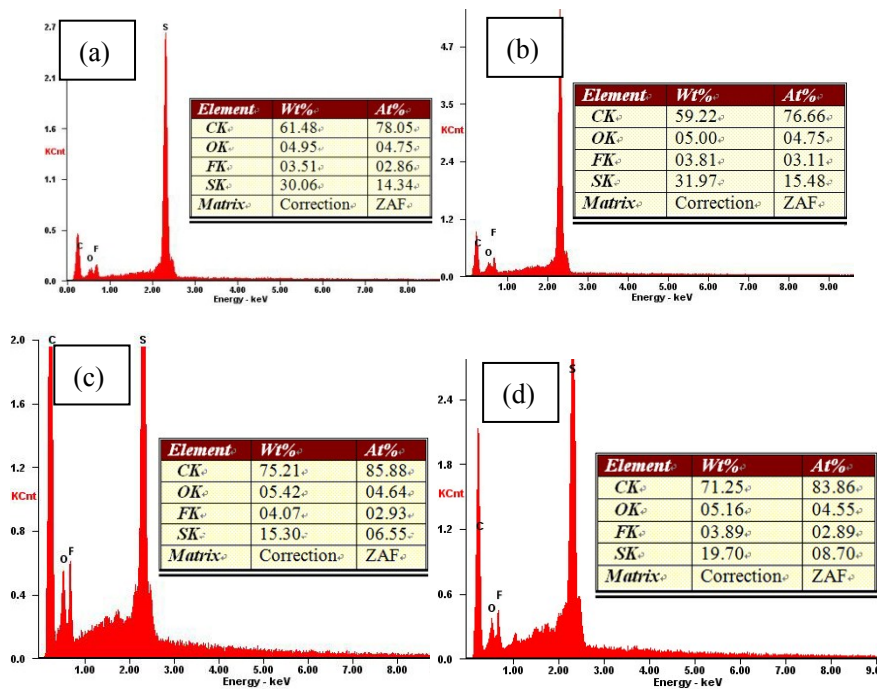


Fig. S10 The EDS of cathode (a)(b)ZPC-S 44 wt% S and (c)(d)A-ZPC-S 46 wt%:(a)(c)before cycling, (c)(d) after 300 cycling at 1C

Table S1 The surface area, pore volume and average pore size of zeolite, ZPC, A-ZPC and A-ZPC-S composite with different sulfur loading

Material	Surface Area (m <sup>2</sup> g <sup>-1</sup> )	Pore volume (cm <sup>3</sup> g <sup>-1</sup> )	Average Pore Size (Å g <sup>-1</sup> )
Zeolite	537	0.3836	28.6
ZPC	707.9	0.954	64.4
A-ZPC	767.8	1.113	53.9
S loaded A-ZPC	46 wt.%	83.8	0.295
	57 wt.%	45.6	0.086
	63 wt.%	20.2	0.013

Table S2 The sulfur maintenance of ZPC-S cathode and A-ZPC-S cathode after 300 cycles at 1C

	0 cycle	300 cycles	Mass loss
ZPC-S	30.06%	15.30%	49.1%
A-ZPC-S	31.97%	19.70%	38.38%