Supporting information

Conductive Natural Fibers as Dual-Functional Conductive Agent: High Conductivity and Stress Relief in Silicon-Based Anodes

Yiting Xiao[1], Fan Yang[1], Siying Li[1], Xingyu Sun[1], Siyu Jian[1], Dan Qian[1], Xingyu Xia[1], Siyu Li[1], Chuhan Zhou[1], Yangtian Lu[3], Ziwei Wang[3], Min Ling[1,], Bin Wang[2,*], Chengdu Liang[1,*] and Xianbo Yu[4,*]*

[1]Zhejiang Provincial Key Laboratory of Advanced Chemical Engineering Manufacture Technology, College of Chemical and Biological Engineering, Zhejiang University, Hangzhou, 310027, China

[2]Minmetals Exploration & Development CO. LTD, Beijing, 100010, China

[3]Zhejiang Research Institute of Chemical Industry Co., LTD, Hangzhou, Zhejiang, 310023, China

[4]Sinochem Lantian Fluoro Materials Co., Ltd, Hangzhou, Zhejiang, 310052, China

Corresponding Authors: E-mail: minling@zju.edu.cn, wangbin0502@163.com, cdliang@zju.edu.cn, yuxianbo@sinochem.com

Graphical Abstract:

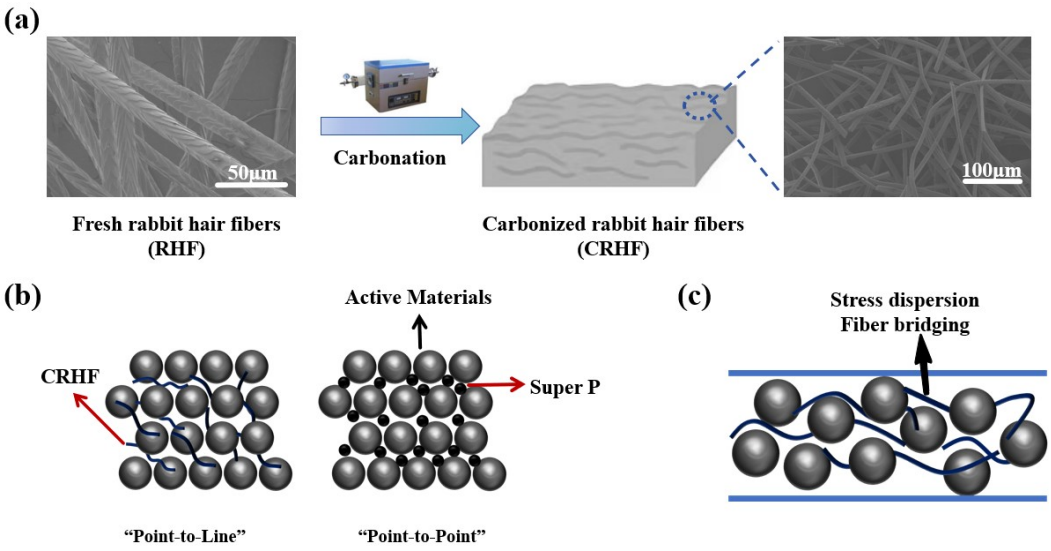

Fig. S1. The physical image of RHF.

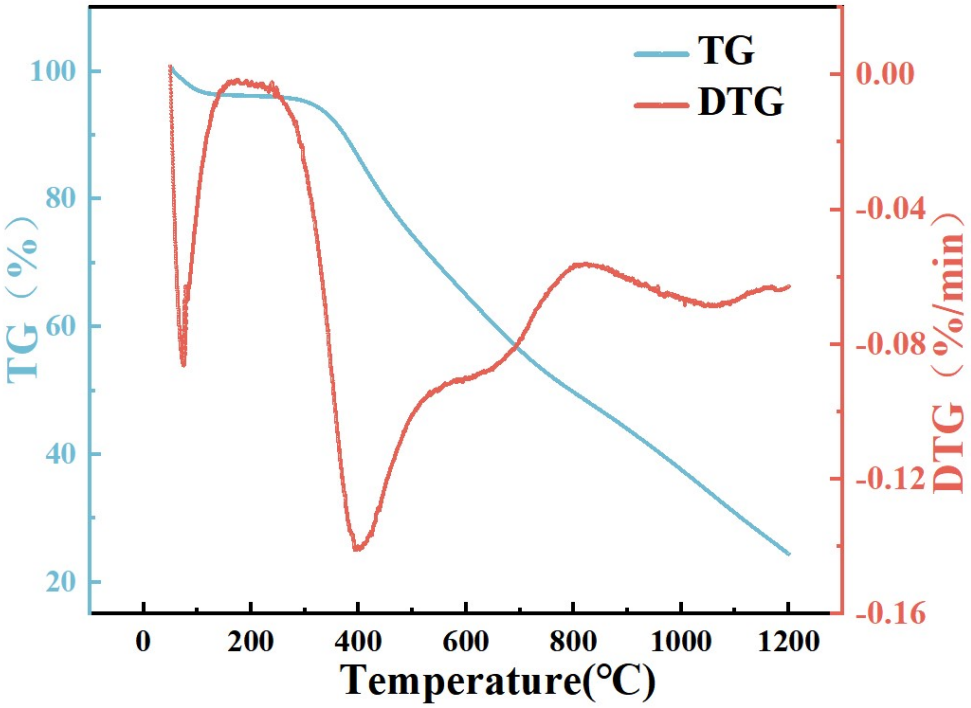

Fig. S2. TG/DTG image of CRHF

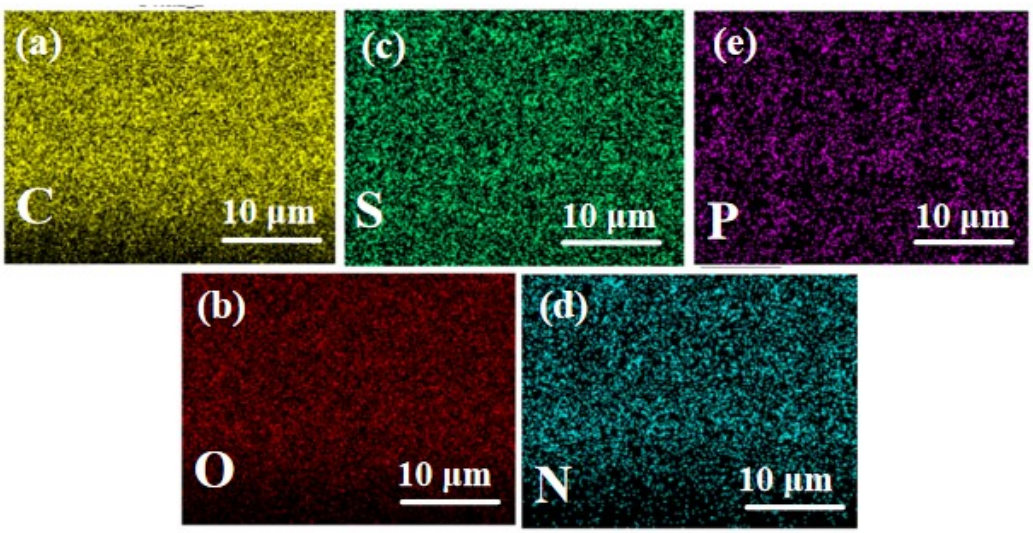

Fig. S3. EDS Mapping results of RHF (C; S; P; O; N).

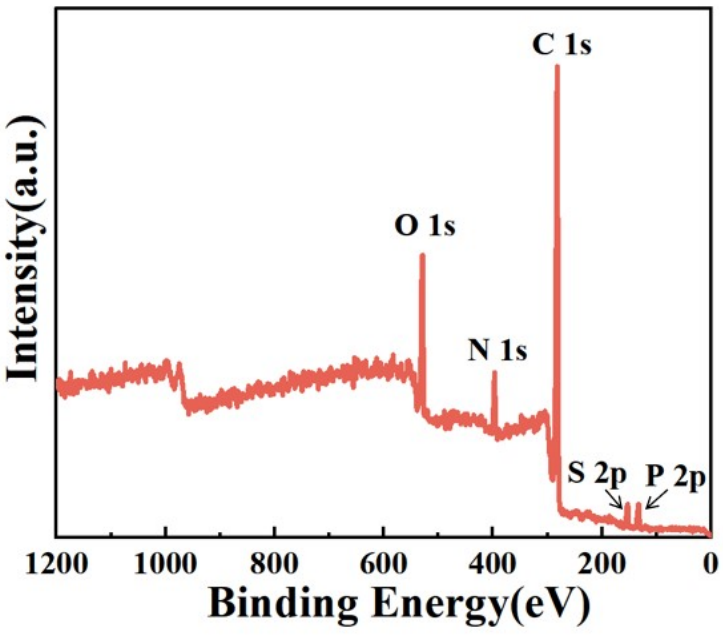

Fig. S4. Survey spectra of the RHF.

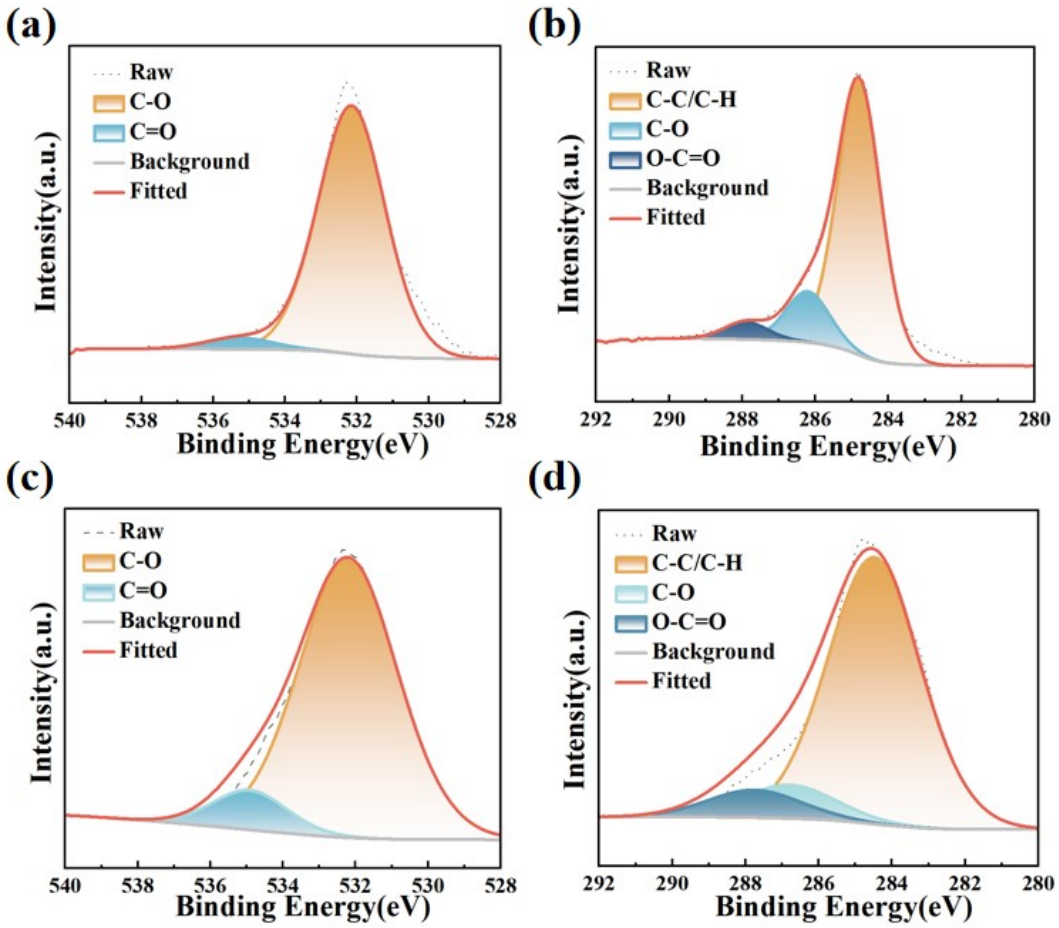

Fig. S5. (a) O 1s and (b) C 1s XPS spectrum of CRHF-800; (c) O 1s and (d) C 1s XPS spectrum of RHF.

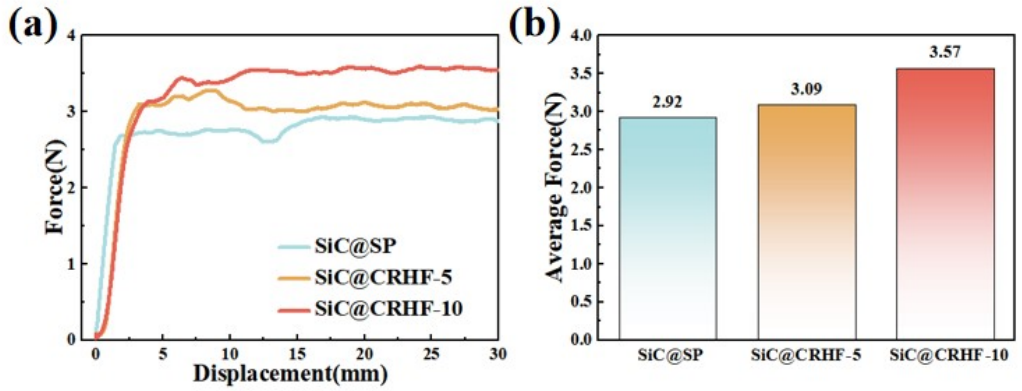

Fig. S6. (a)180° peeling test of different SiC electrodes; (b)average peeling force of different SiC Electrodes.

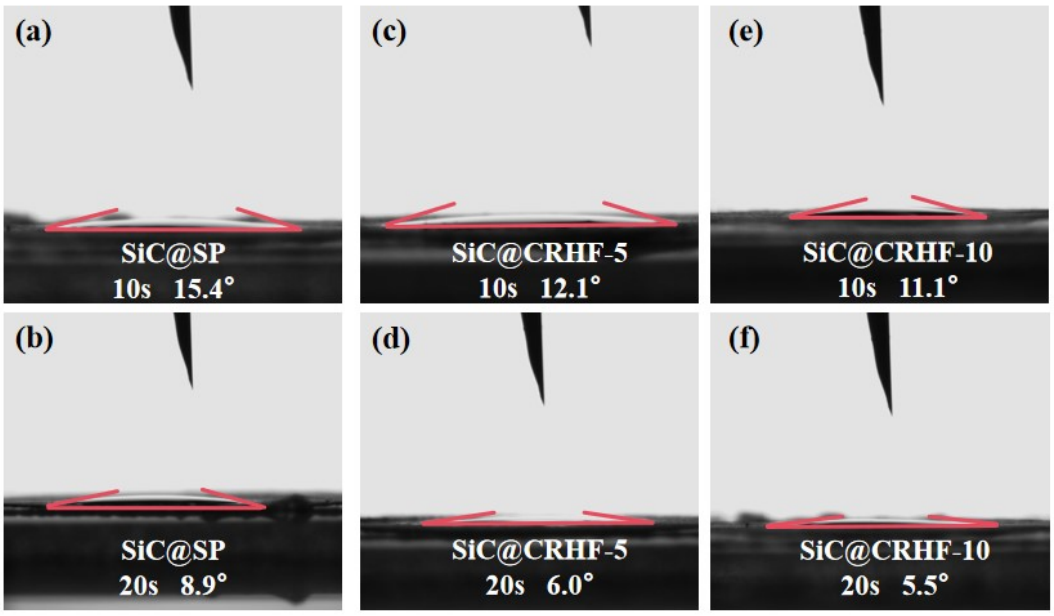

Fig. S7. The contact angle of different SiC electrodes to the electrolyte at 10 s and 20 s

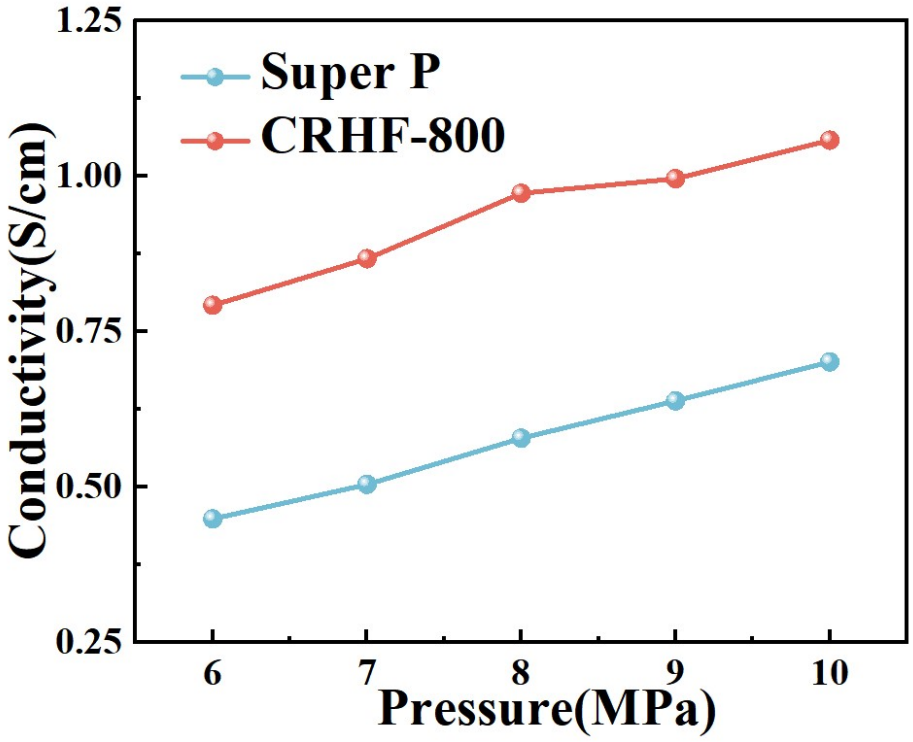

Fig. S8. Conductivity of the Super P and CRHF-800 under different pressure.

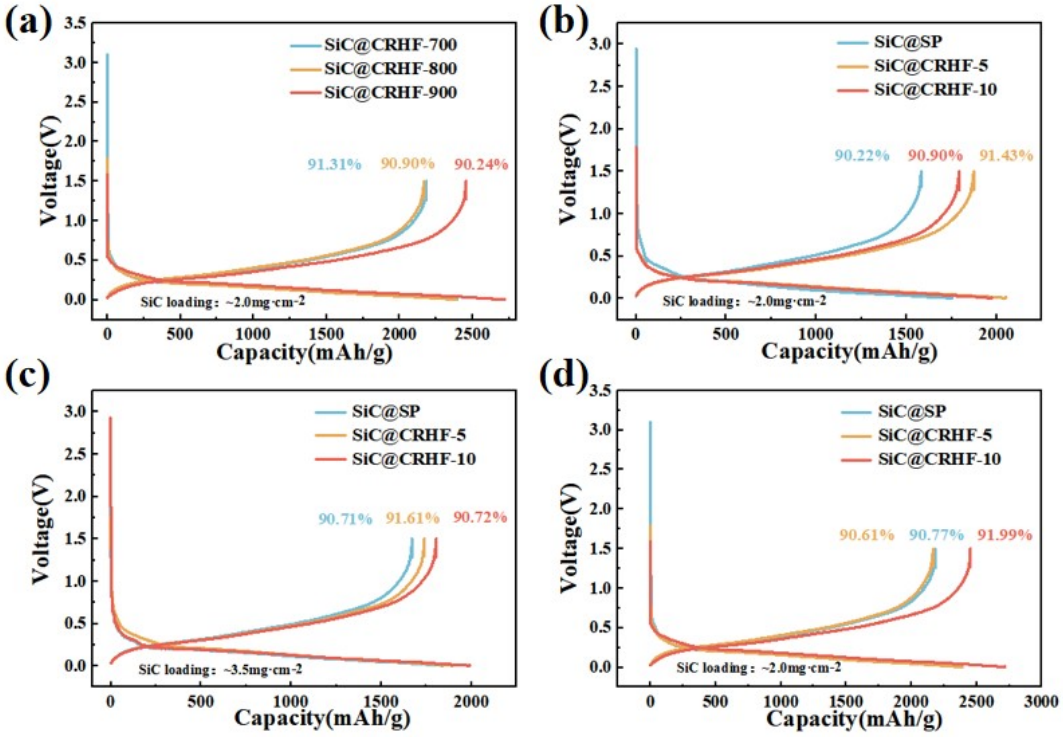

Fig. S9. Initial charge–discharge curves of the (a) SiC@CRHF-700, SiC@CRHF-800 and SiC@CRHF-900 at 0.3 C; (b) Cycling performances of the various SiC electrodes at 0.3 C; (c) High-loading SiC electrodes at 0.3 C; (d) Cycling performances of the various SiC electrodes at 0.5 C.

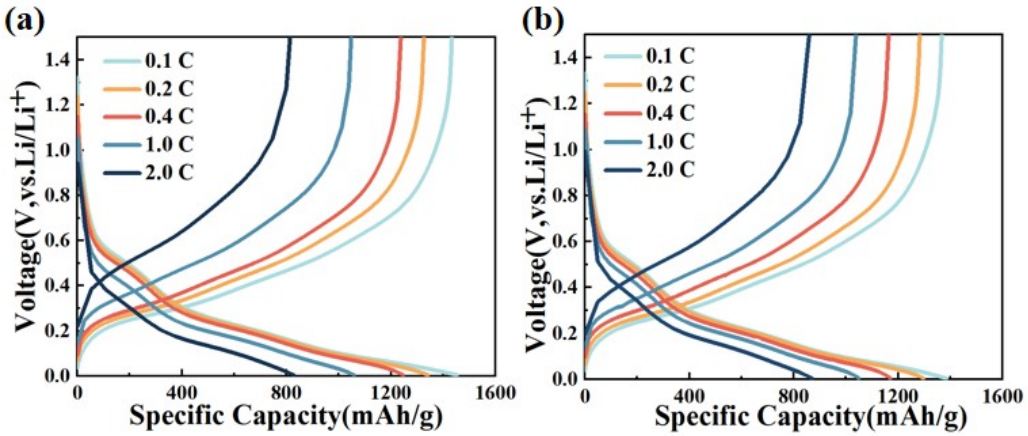

Fig. S10. GCD plots of the rate cycling of (a) SiC@SP electrode and (b) SiC@CRHF-5 electrode.

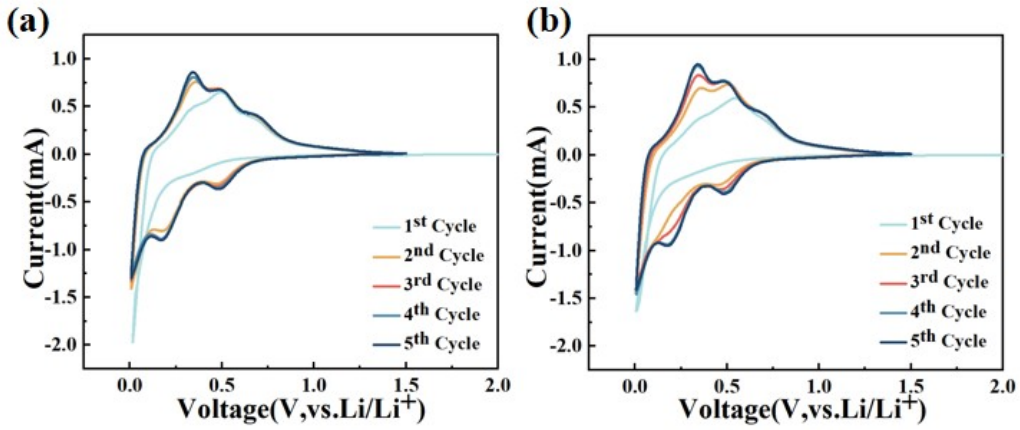

Fig. S11. CV curves of (a) SiC@SP electrode and (b) SiC@CRHF-5 electrode.

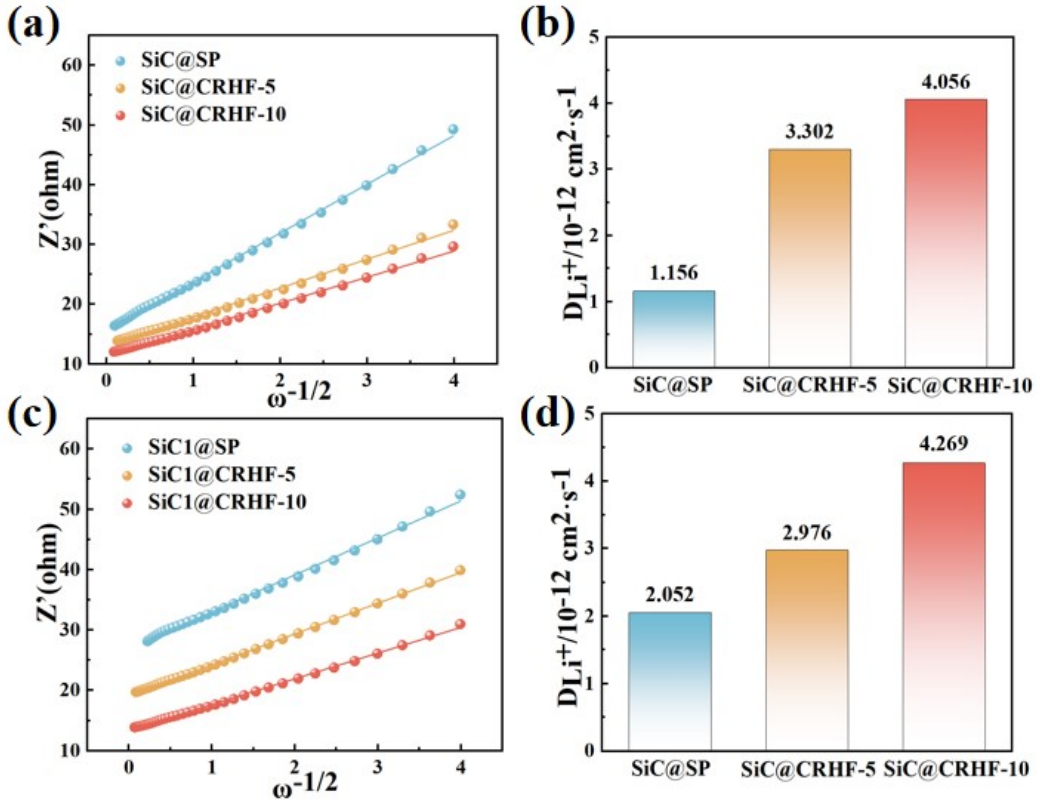

Fig. S12. (a) Various SiC electrodes Warburg impedance plot after 20 cycles at 0.3 C; (b) D_{Li+} calculated from fitting results of (a); (c) Various SiC electrodes Warburg impedance plot after 30 cycles at 0.3 C; (d) D_{Li+} calculated from fitting results of (c);

Table S1 Weight percentages of elements of RHF and CRHF

wt% 元素	RHF	CRHF
C	47.80	80.90
N	19.34	10.61
O	29.41	6.59
P	0.16	0.31
S	3.29	1.59

Table S2 Quantitative XPS analysis of Li_2CO_3, $ROCO_2Li$, and LiF fractions of different SiC electrodes before and after cycling

Component Typology	C 1s	O 1s		LiF
	C=O，Li_2CO_3，$ROCO_2Li$	Li_2CO_3	$ROCO_2Li$	
SiC@SP	17885	29940	66117	303
SiC@CRHF-5	17009	28473	104652	677
SiC@CRHF-10	11082	21246	114231	1051