Energy Materials

Supplementary Materials

Intense pulsed light-induced selective conversion of printed silicon nanoparticles into graphene embedding silicon carbide on plastic for the next generation flexible lithium-ion batteries

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Table S1. Thermal properties of Upilex and Si

	Upilex	Si
ρ [Kg/m^3]	1470	2,200
κ [W/m.K]	0.29	0.07 ($T<T_{melt}$) and 19.0±0.9 ($T>T_{melt}$)
Cp [J/kg.K]	1130	736
Thickness (μm)	50	0.03
Emissivity	0.95	0.04

Table S2. Si-based lithium-ion battery anodes

Anode materials	Method used	Initial discharge [mAh g^{-1}]/Current density[A g^{-1}]	Capacity/Cycles/Current density [mAh g^{-1}]/–/[A g^{-1}]	ICE [%]	Ref
Si thin films	Magnetron sputtering	3134 at 0.025C	1317/500 at 0.5C	87	[1]
Si/C	Chemical synthesis	1157/0.05	452 /50/0.05	76.3	[2]
Si NPs	Ball milling	3075/0.05	804/400/1	84.5	[3]
Si NPs	Ball milling	3250/ 0.48	1600/600/0.48	81	[4]
Si NPs	Ball milling	2196/0.1	1480/100/0.1	67.3	[5]
S/C	CVD	1950/ 0.0975	1500/100/1.95	86	[6]

Si NPs/SiO_2	ball milling	805.57/0.2	704.79/500/0.2	88	[7]
Si NWs	CVD	1300/0.85	1060/100/0.85	86.2	[8]
Si/MWCNTs	Magnesiothermic reduction	1586/0.2	1038/170/0.2	48.3	[9]
Si NSs	DC-arc discharge	2553/0.1	441.7/40/0.1	49	[10]
Si NSs	liquid oxidation and exfoliation	1375/0.1	596/1800/1	61.6	[11]
Si NTs	Electrospinning/CVD	650 at 12C	570/6000 at 12C	76	[12]
Si HSs	CVD	2725 at 0.1 C	1420/700 at 0.5C	77	[13]
Mesoporous Si	Magnesiothermic reduction	4819/0.05	1004/50/0.05	64.2	[14]

Porous Si membrane	HCl-leaching and water-rinsing	3420/0.1	1220.2/100/1	71.8	[15]
Ag coated Si	Reduction of mesporous SiO_2	2416/0.1	1600/100/0.1	73.7	[16]
Si/C	Magnesiohermic reduction of rice husk	2790/0.084	1500/300/2.1	70	[17]
Si/C	Magnesiothermic reduction of diatomite	1826/0.05	240/30/0.05	68.5	[18]
SiC@G	**Inkjet printing + IPL**	**2050/1**	**1856/200/1**	**59.2**	**This work**

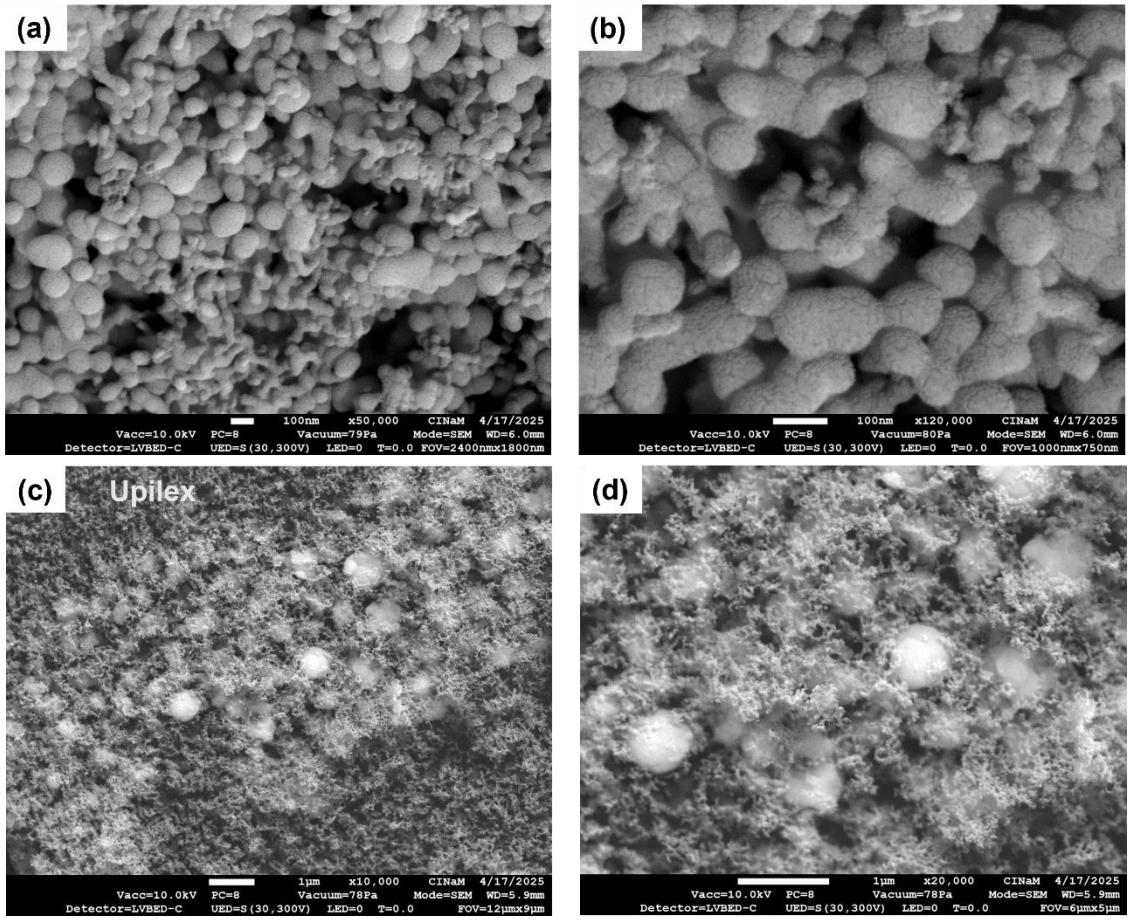

Figure S1. SEM images of inkjet-printed Si films: (a, b) as-deposited, showing a homogeneous and dense nanoparticle layer, (c, d) after intense pulsed light treatment.

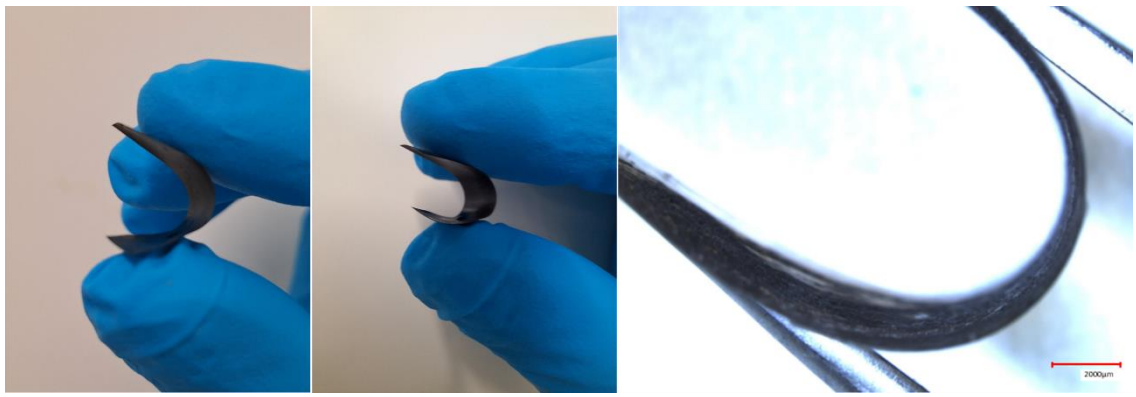

Figure S2. Optical images demonstrating the mechanical flexibility of the inkjet-printed SiC electrode.

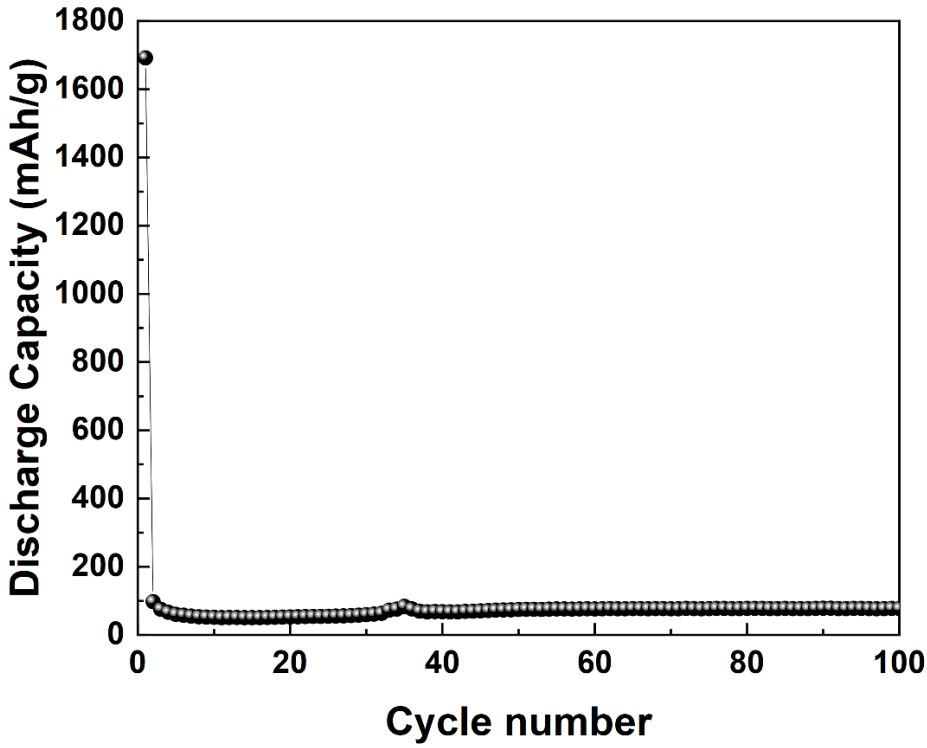

Figure S3. Cycling behavior of the pristine Si electrode before IPL treatment

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