Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Supplementary Information

Superior Electric Double Layer Capacitors Using Micro- and Mesoporous Silicon Carbide Sphere

By Myeongjin Kim, Ilgeun Oh and Jooheon Kim*

*Corresponding author: Prof. Jooheon Kim

School of Chemical Engineering & Materials Science,

Chung-Ang University, Seoul 156-756, Korea

E-mail: jooheonkim@cau.ac.kr

1. Low-magnification FE-SEM image for MMPSiC

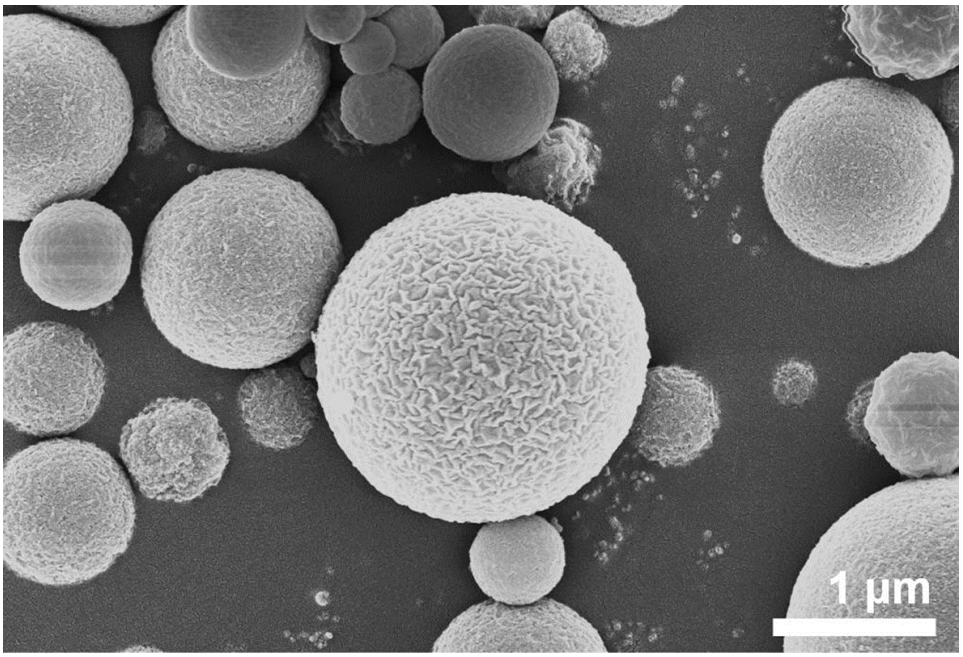

Figure S1. Low-magnification FE-SEM image of MMPSiC.

2. XRD analysis for silicon nanoparticle

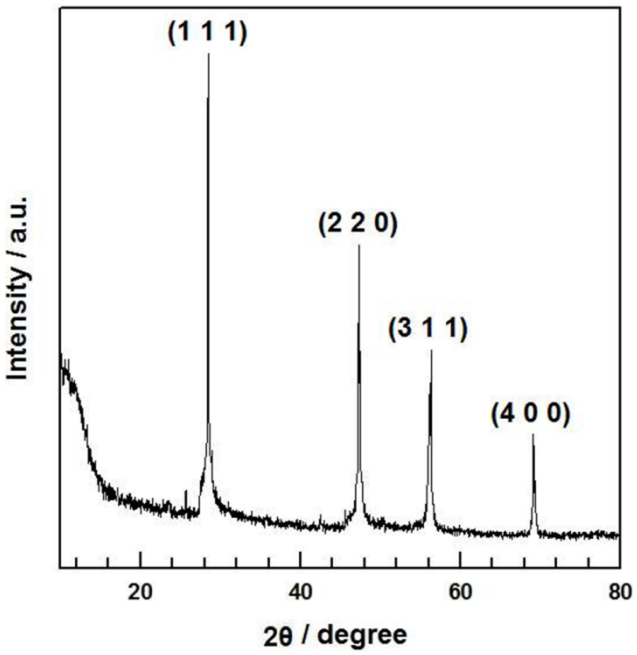

Figure S2. XRD pattern of silicon nanoparticle.

3. XPS analysis for MMPSiC

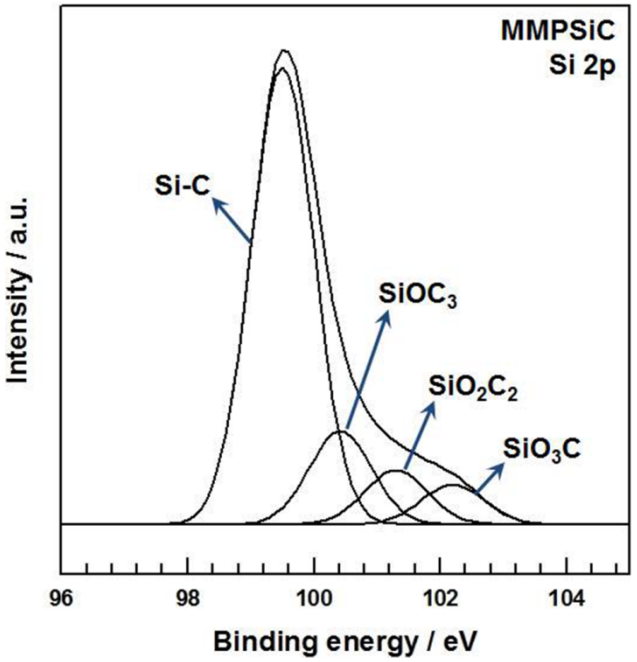

Figure S3(a). XPS Si 2p spectra of MMPSiC.

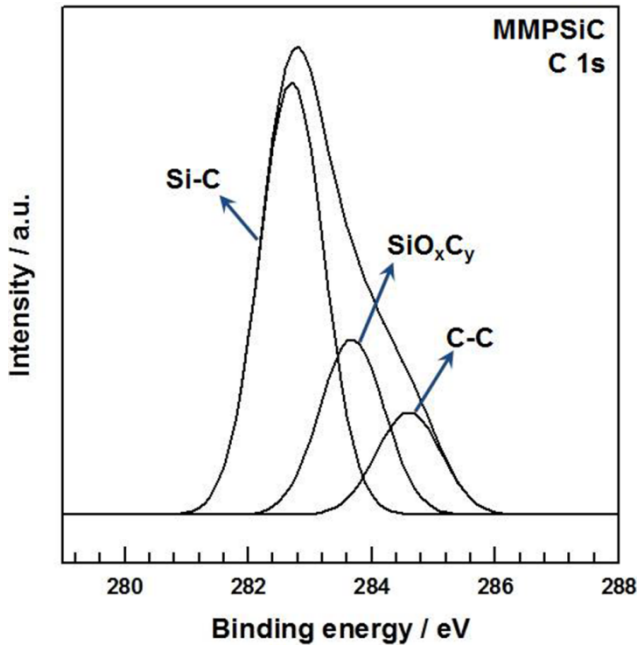

Figure S3(b). XPS C 1s spectra of MMPSiC.

Table S1. The Si 2p peak position and the relative atomic percentages of various functional groups in MMPSiC.

	Fitting of the Si 2p peak Binding energy [eV] (relative atomic percentage [%])			
	Si-C	$SiOC_3$	SiO_2C_2	SiO_3C
MMPSiC	99.51 (70.88)	100.42 (14.45)	101.31 (8.45)	102.2 (6.22)

Table S2. The C 1s peak position and the relative atomic percentages of various functional groups in MMPSiC.

	Fitting of the C 1s peak Binding energy [eV] (relative atomic percentage [%])		
	Si-C	SiO_xC_y	C-C
MMPSiC	282.72 (60.87)	283.68 (24.69)	284.61 (14.44)

4. Electrochemical performance of MMPSiC electrode by three-electrode configuration in 1M Na_2SO_4 aqueous electrolyte.

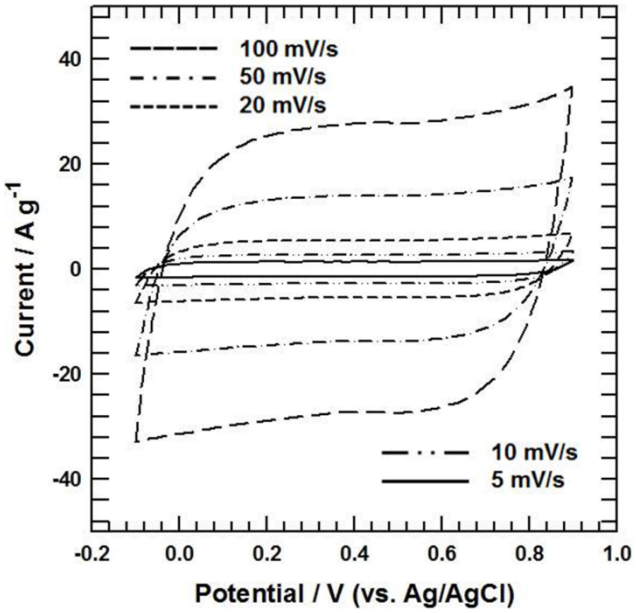

Figure S4(a). CV curves of MMPSiC electrode measured as different scan rates of 5, 10, 20, 50 and 100 mV s^{-1}.

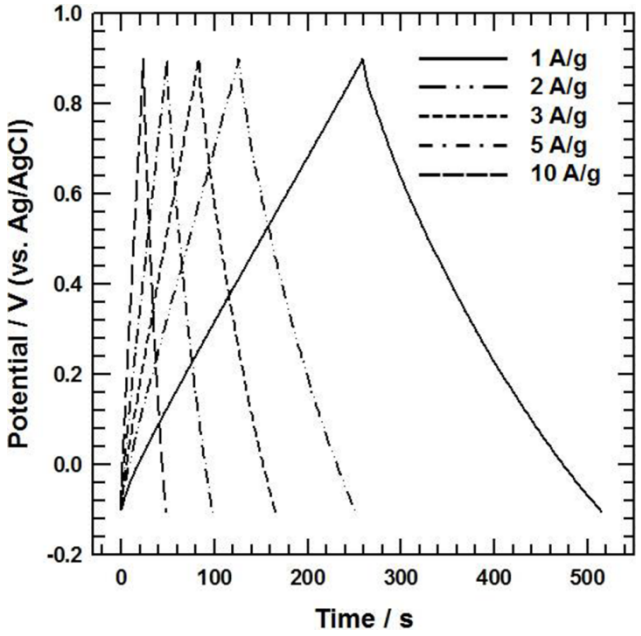

Figure S4(b). Galvanostatic charge/discharge curves of MMPSiC electrode measured as different current densities of 1, 2, 3, 5 and 10 A g^{-1}.

5. Electrochemical performance of two-electrode supercapacitors based on MMPSiC electrodes with 1M Na_2SO_4 aqueous electrolyte.

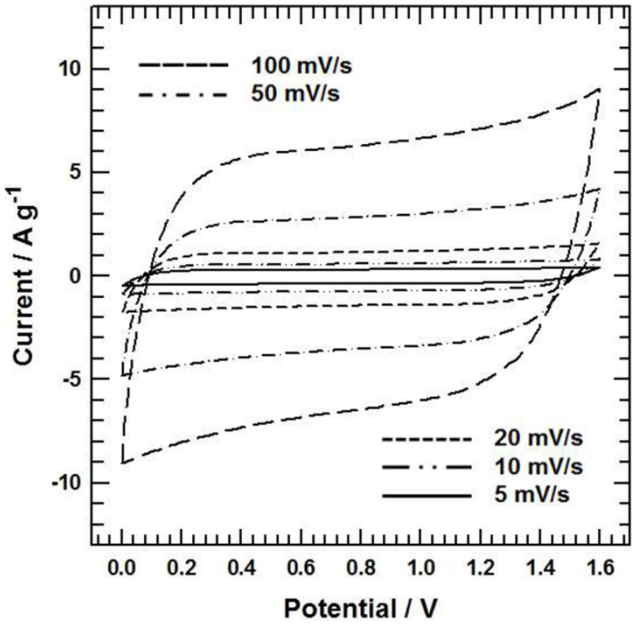

Figure S5(a). CV curves of two-electrode supercapacitor measured as different scan rates of 5, 10, 20, 50 and 100 mV s^{-1}.

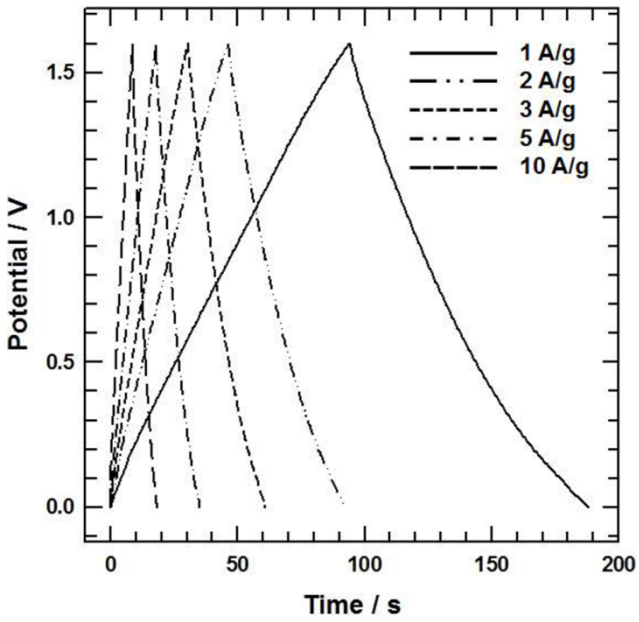

Figure S5(b). Galvanostatic charge/discharge curves of two-electrode supercapacitor measured as different current densities of 1, 2, 3, 5 and 10 A g^{-1}.

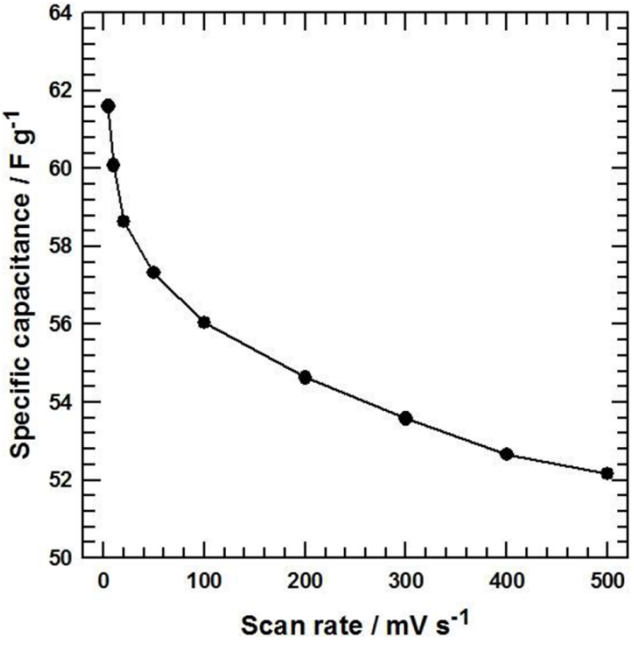

Figure S5(c). Specific capacitance of two-electrode supercapacitor at different scan rates.

6. Electrochemical performance of two-electrode supercapacitors based on MMPSiC electrodes with 3-ethyl-3-methylimidazolium bis(trifluorosulfonyl)imide, [EMIM][TFSI] ionic liquid electrolyte.

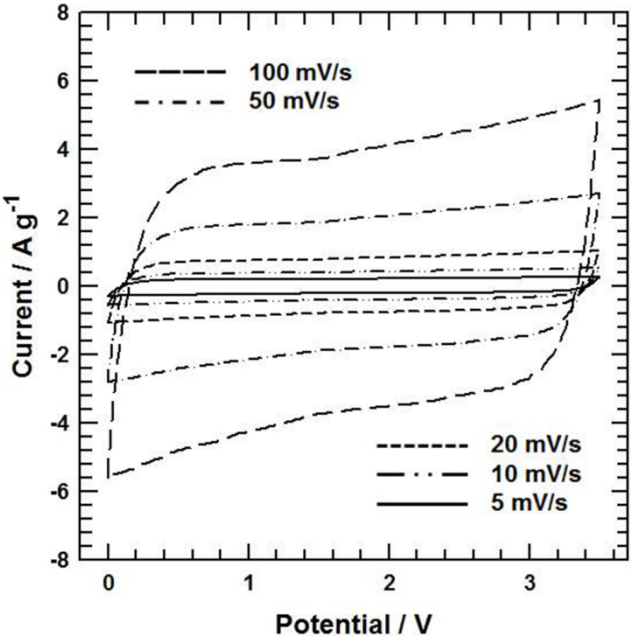

Figure S6(a). CV curves of two-electrode supercapacitor measured as different scan rates of 5, 10, 20, 50 and 100 mV s^{-1}.

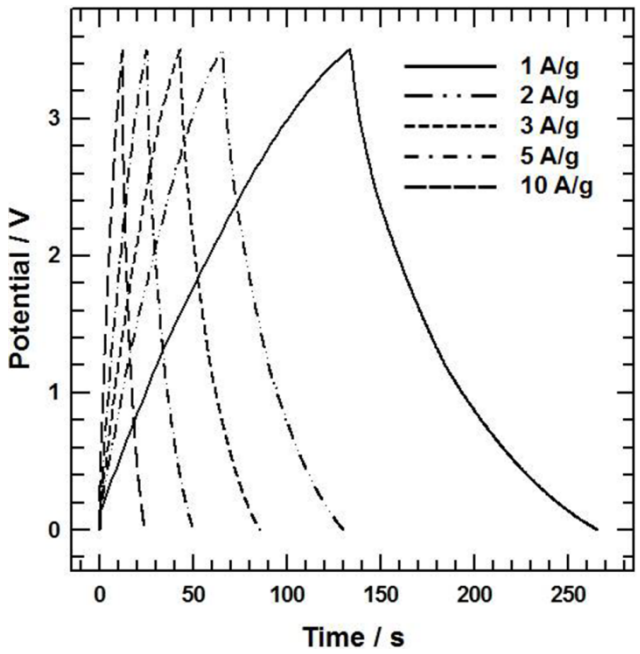

Figure S6(b). Galvanostatic charge/discharge curves of two-electrode supercapacitor measured as different current densities of 1, 2, 3, 5 and 10 A g^{-1}.

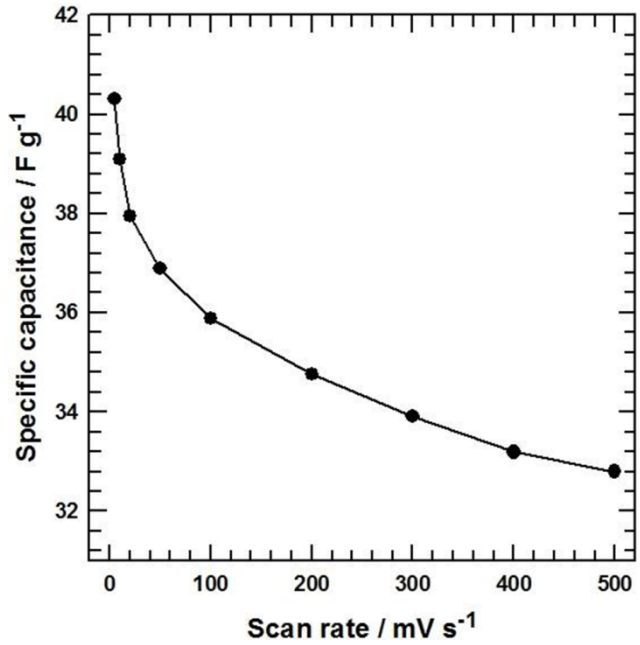

Figure S6(c). Specific capacitance of two-electrode supercapacitor at different scan rates.

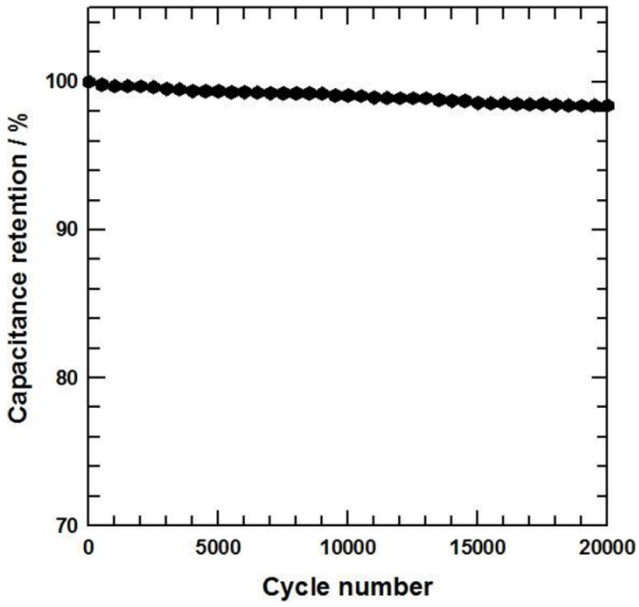

Figure S6(d). Cycling stability of two-electrode supercapacitor measured at a current density of 10 A g^{-1}.