

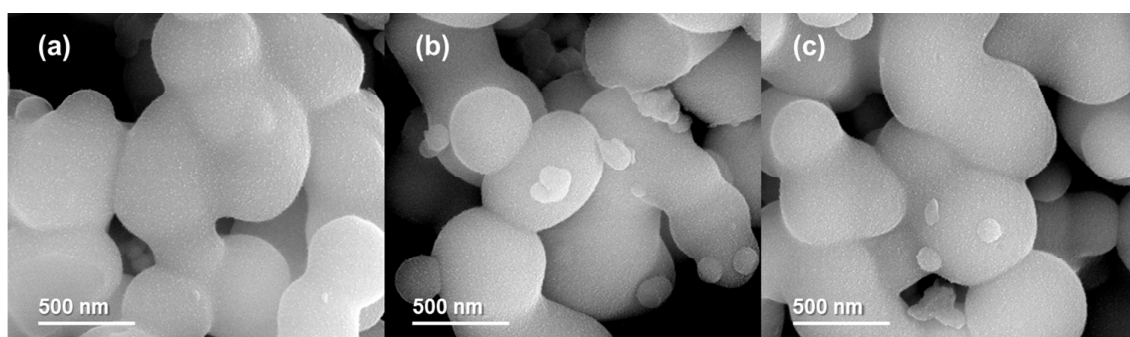
**Supporting Information for**  
**Dual-Size Silicon Nanocrystal-Embedded SiO<sub>x</sub> Nanocomposite**  
**as a High-Capacity Lithium Storage**

*Eunjun Park<sup>a</sup>, Hyundong Yoo<sup>a</sup>, Jaewoo Lee<sup>b</sup>, Min-Sik Park,<sup>b\*</sup> Young-Jun Kim<sup>b</sup>, Hansu*

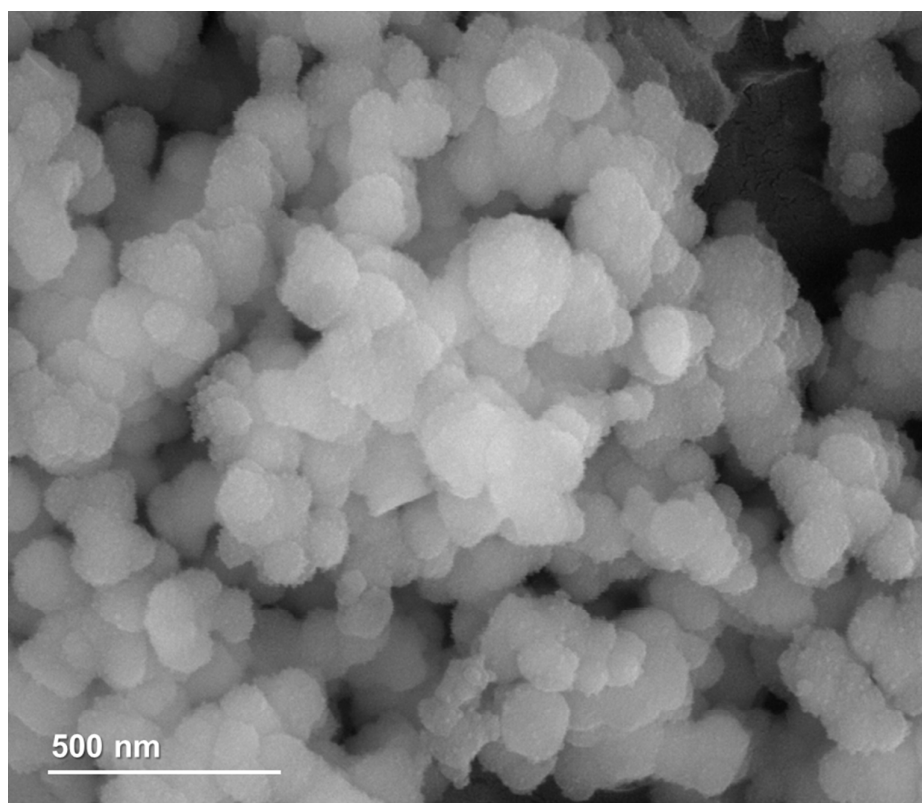
*Kim<sup>a,\*</sup>*

<sup>a</sup>Department of Energy Engineering, Hanyang University, 222 Wangsimni-ro, Seongdong-gu,  
Seoul, 133-791, Republic of Korea.

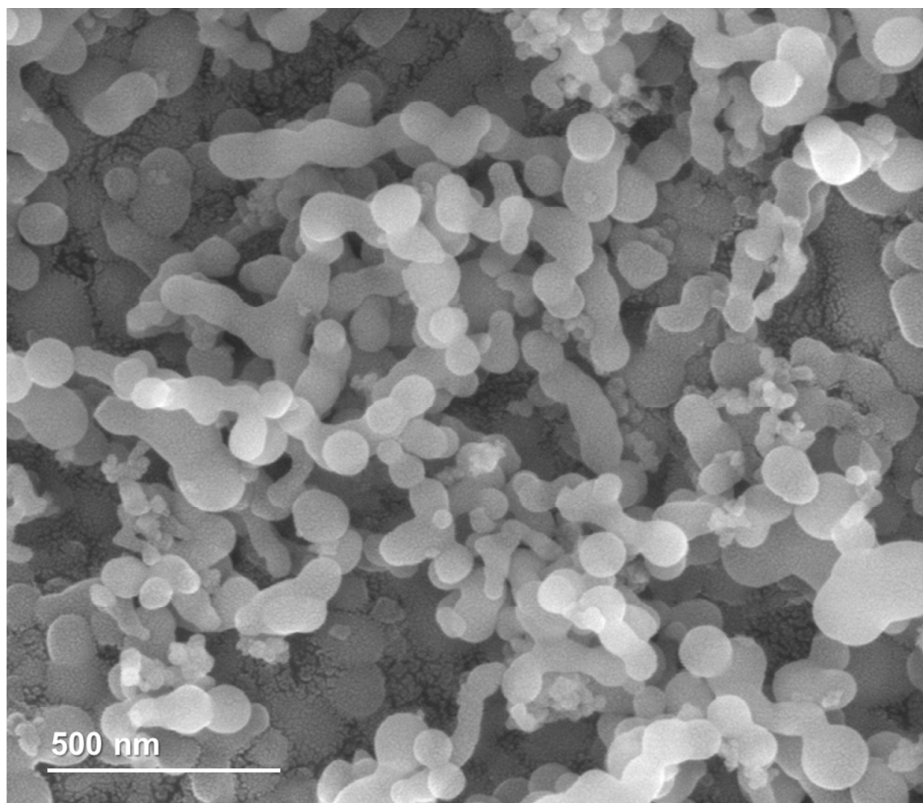
<sup>b</sup>Advanced Batteries Research Center, Korea Electronic Technology Institute, 68 Yatap-dong,  
Bundang-gu, Seongnam 463-816, Republic of Korea.



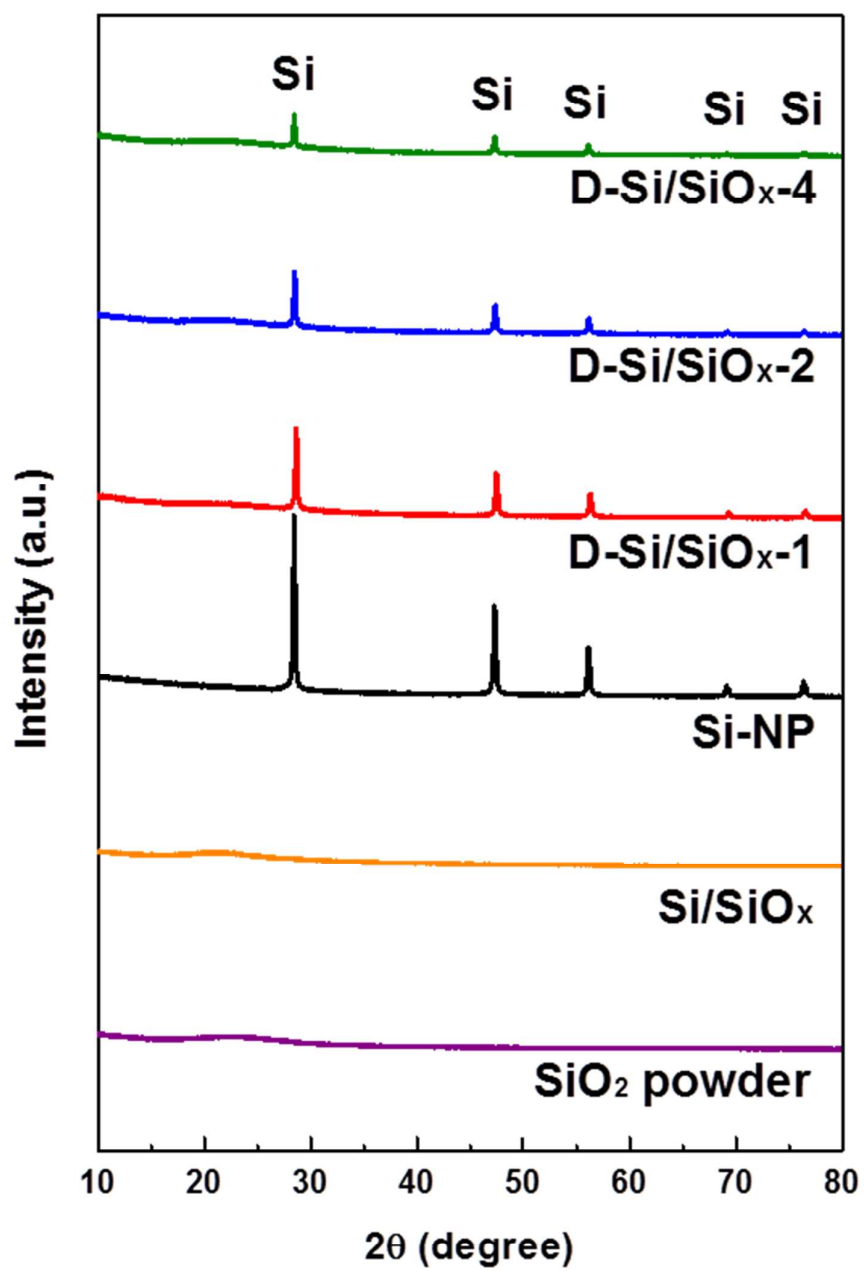
**Figure S1.** FESEM images of dual-sized Si nanocrystals embedded Si/SiO<sub>x</sub> nanocomposites; (a) D-Si/SiO<sub>x</sub>-1, (b) D-Si/SiO<sub>x</sub>-2 and (c) D-Si/SiO<sub>x</sub>-4.



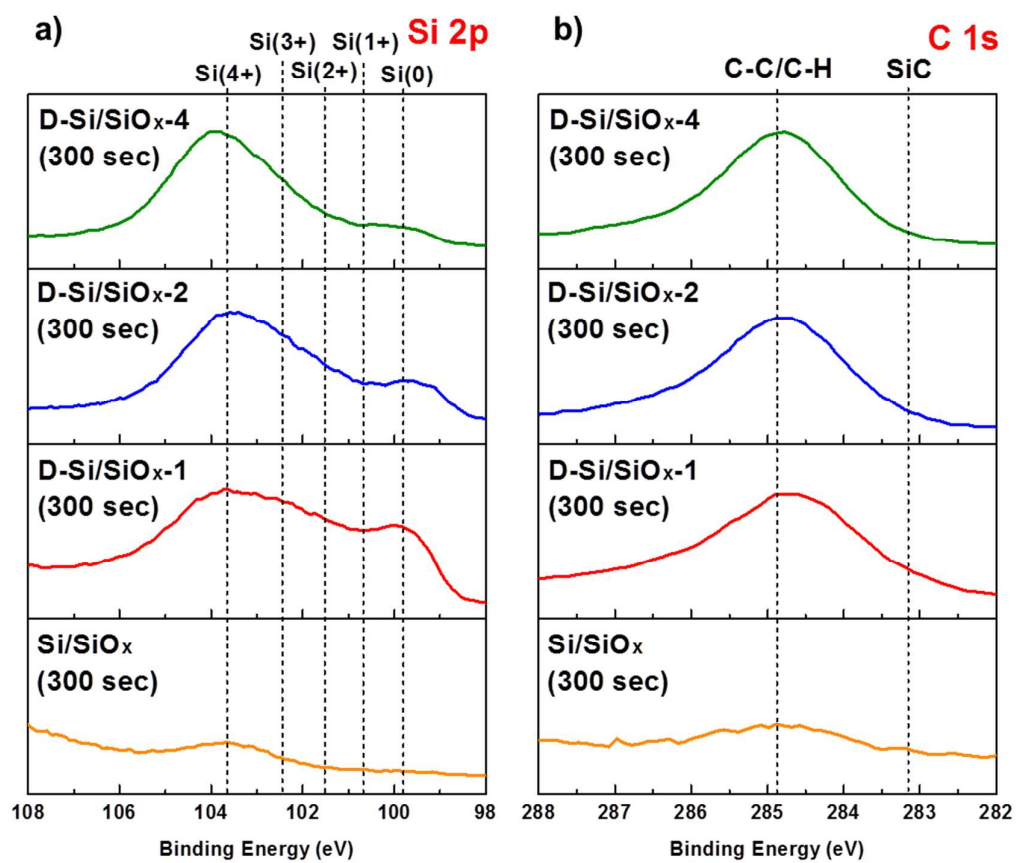
**Figure S2.** FESEM image of Si/SiO<sub>x</sub> nanocomposite without Si-NP.



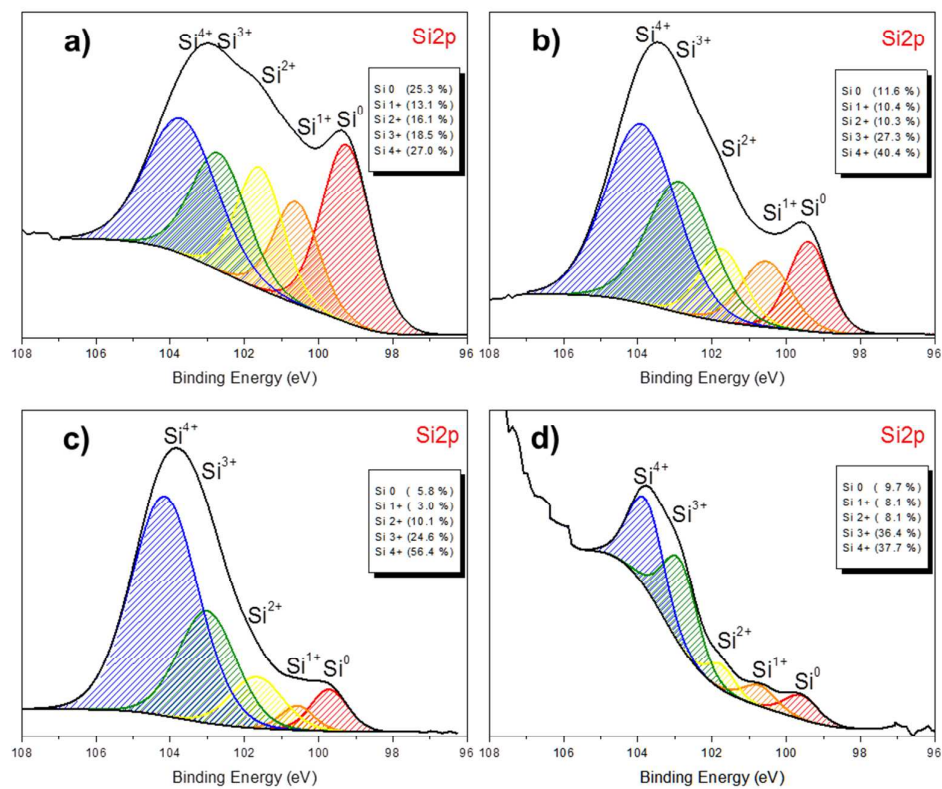
**Figure S3.** FESEM image of commercial Si nanoparticles (Si-NP).



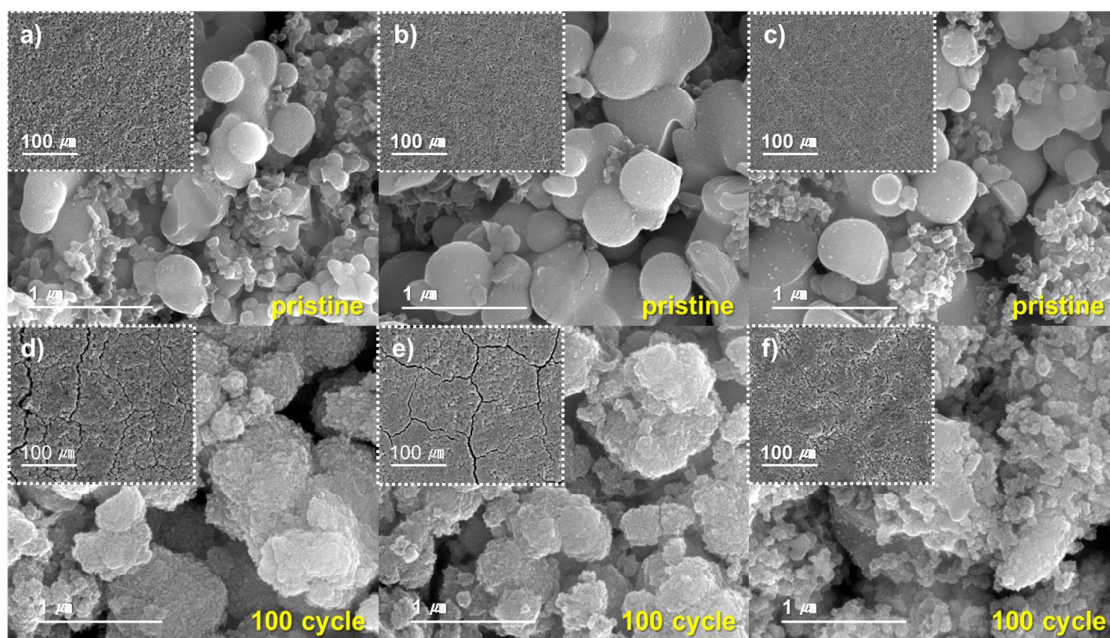
**Figure S4.** X-ray diffraction (XRD) patterns of D-Si/SiO<sub>x</sub>-1, D-Si/SiO<sub>x</sub>-2, D-Si/SiO<sub>x</sub>-4 with those of Si-NP, Si/SiO<sub>x</sub> and Si/SiO<sub>x</sub> composite references.



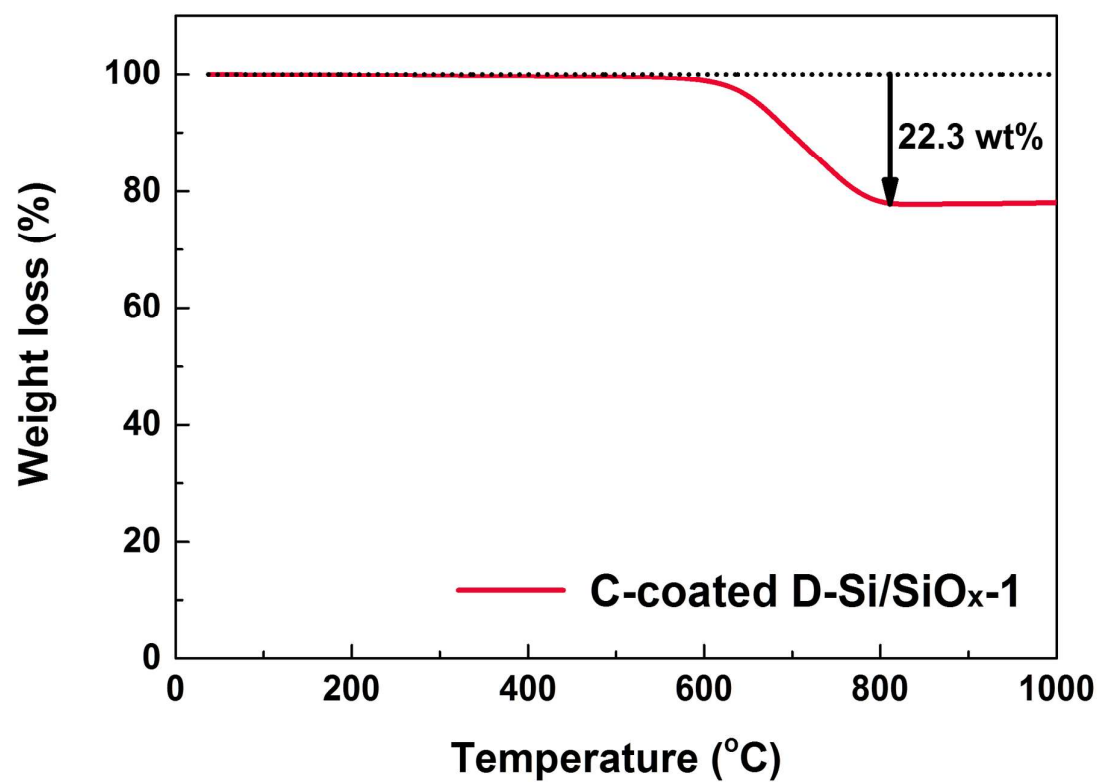
**Figure S5.** (a) Si 2p and (b) C 1s XPS spectra collected from various D-Si/SiO<sub>x</sub> composites (D-Si/SiO<sub>x</sub>-1, D-Si/SiO<sub>x</sub>-2, D-Si/SiO<sub>x</sub>-4) with the Si/SiO<sub>x</sub> composite after Ar<sup>+</sup> sputtering for 300 seconds.



**Figure S6.** XPS Si 2p spectra of various D-Si/SiO<sub>x</sub> with a Si/SiO<sub>x</sub> composites after deconvolution with C 1s excitation at 284.8 eV; (a) D-Si/SiO<sub>x</sub>-1, (b) D-Si/SiO<sub>x</sub>-2, (c) D-Si/SiO<sub>x</sub>-4, (d) the Si/SiO<sub>x</sub> composite after Ar<sup>+</sup> sputtering for 300 seconds.



**Figure S7.** Top-view FESEM images of D-Si/SiO<sub>x</sub> composite electrodes at different cycles; pristine and after 100 cycles electrode (a, d) D-Si/SiO<sub>x</sub>-1 (b, e) D-Si/SiO<sub>x</sub>-2 (c, f) D-Si/SiO<sub>x</sub>-4. Insets show corresponding lower-magnification top-view FESEM images of the samples.



**Figure S8.** TGA curve of C-coated D-Si/SiO<sub>x</sub>-1 nanocomposite after heat treatment at 1000 °C with 30 wt% of coal-tar pitch.