**[Supporting information]**

**Electrochemical capacitance of activated carbons regenerated using thermal and chemical activation**

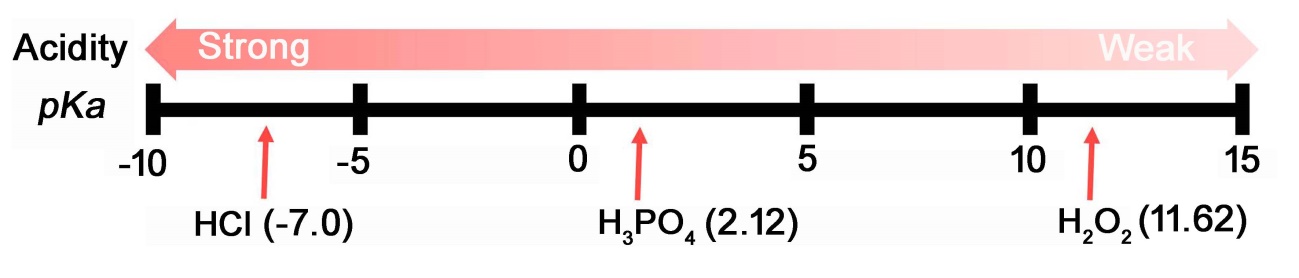
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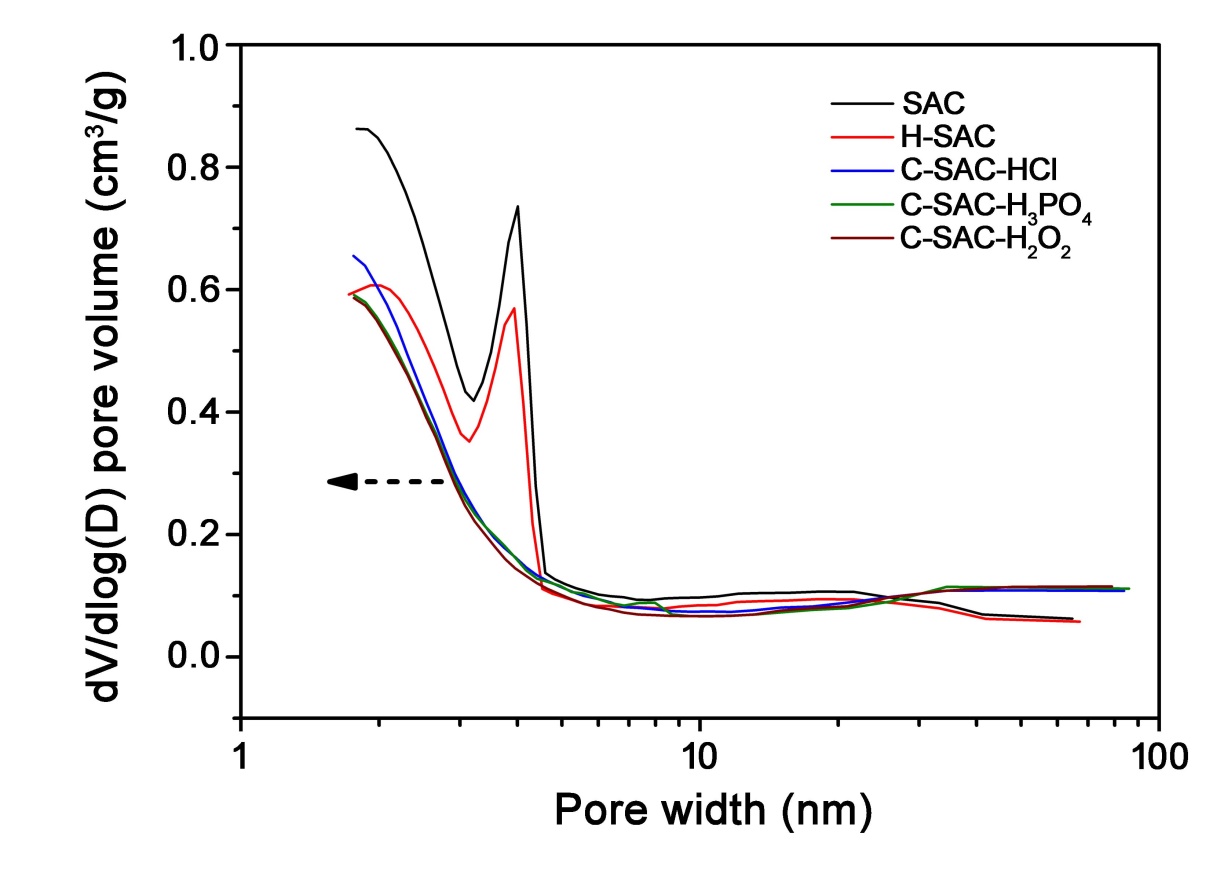
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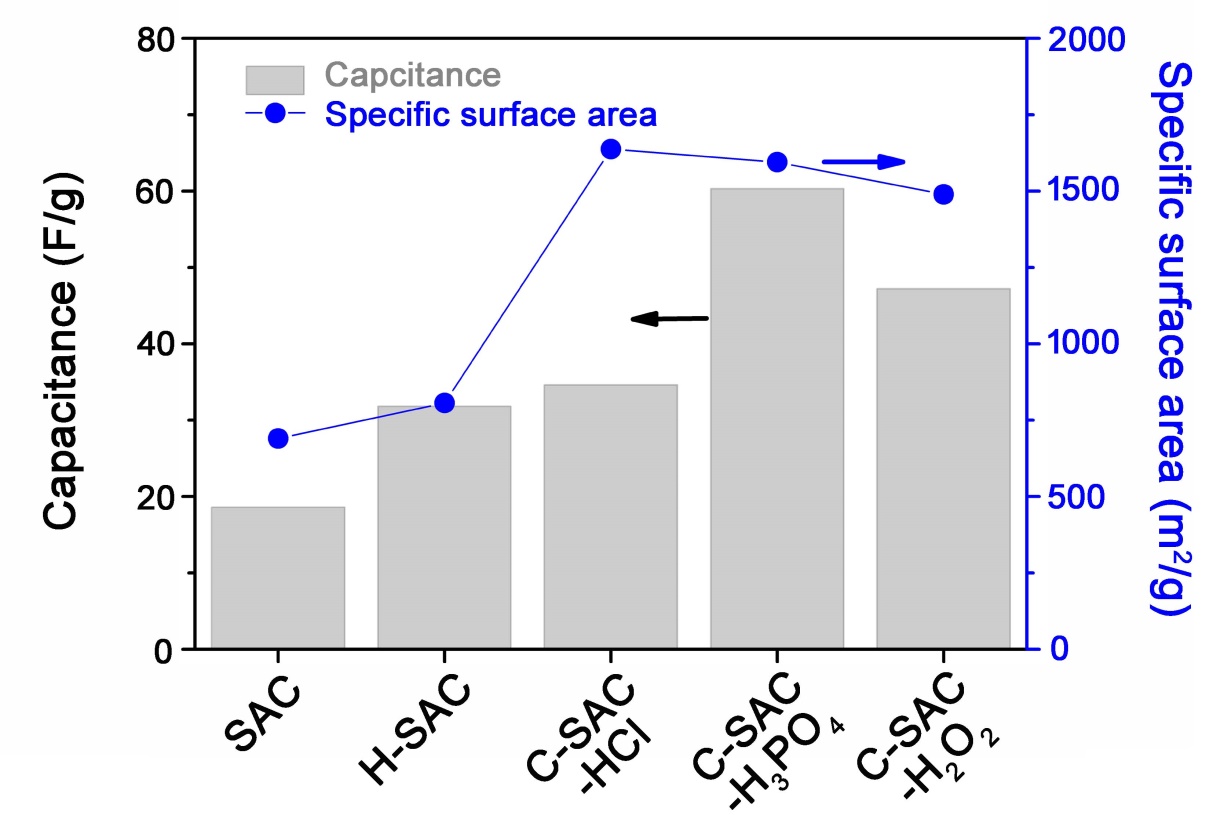
E-mail address: syhwang80@gmail.com (S. Y. Hwang)



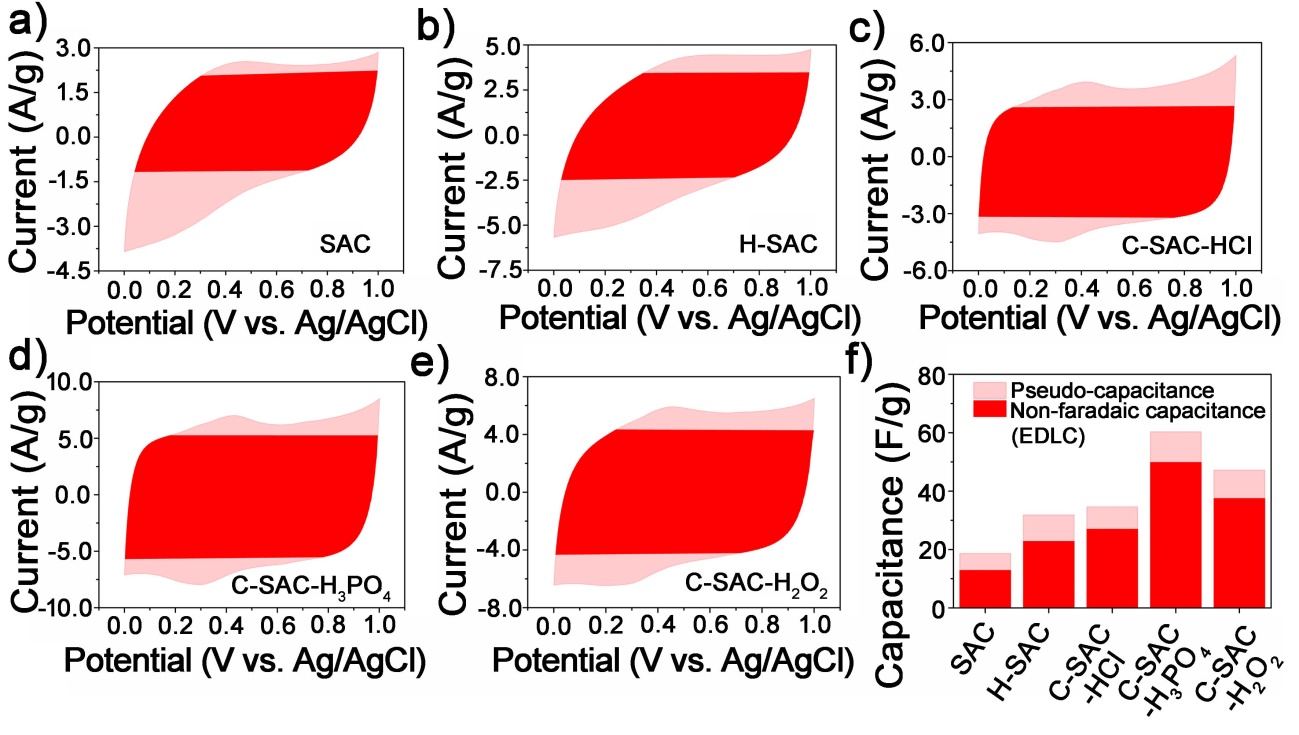
**Fig. S1**. Relative acidity and pKa value of HCl, H3PO4, and H2O2 [1-3].



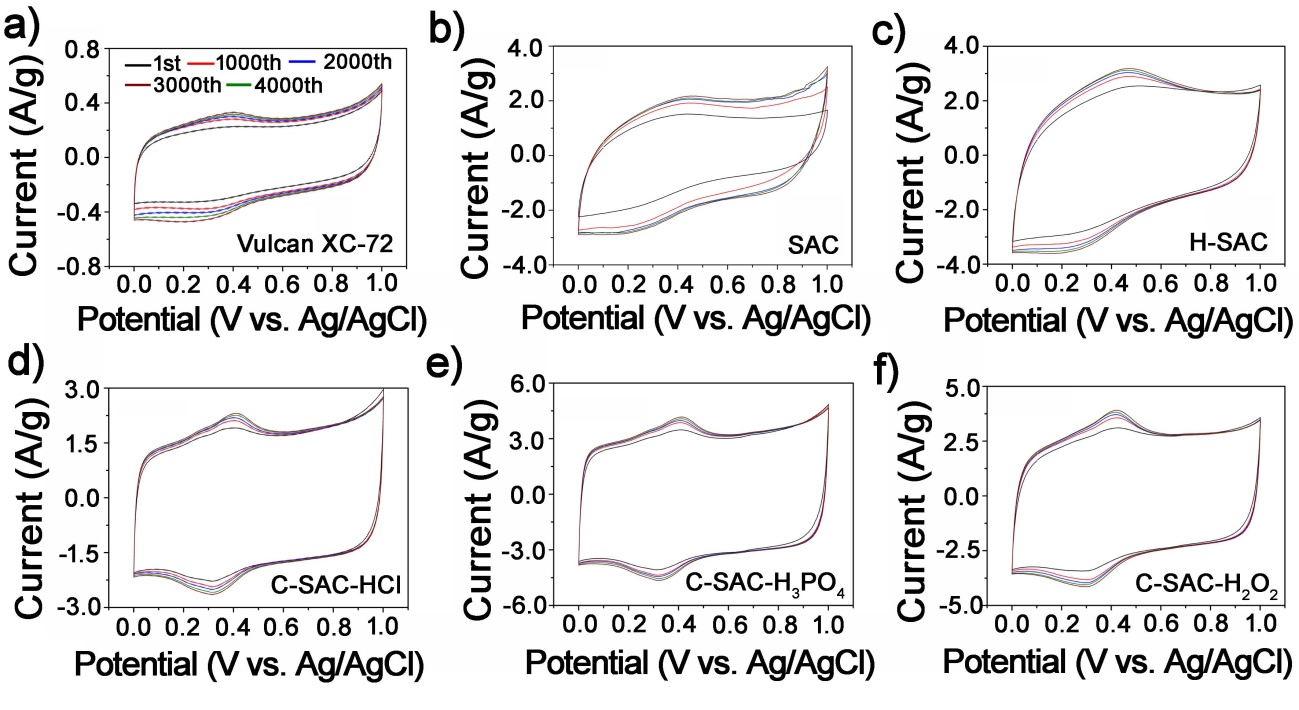
**Fig. S2**. Pore size distribution of SAC, H-SAC, C-SAC-HCl, C-SAC-H3PO4, and C-SAC-H2O2.



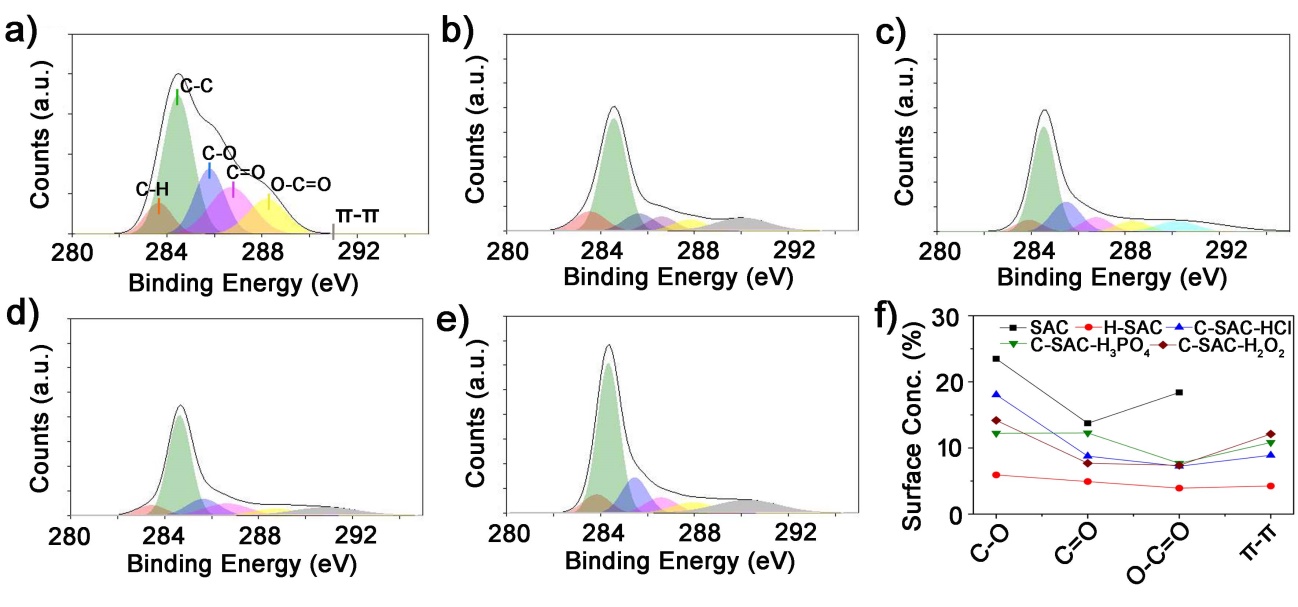
**Fig. S3**. Comparison of capacitance at the scan rate of 200 mV/s and specific surface area of SAC, H-SAC, C-SAC-HCl, C-SAC-H3PO4, and C-SAC-H2O2.



**Fig. S4.** CV curves showing the rectangular non-faradaic (red) and pseudo capacitance area (pink) of SAC (a), H-SAC (b), C-SAC-HCl (c), C-SAC-H3PO4 (d), and C-SAC-H2O2 (e), and comparison of the each capacitance (d) with a scan rate of 200 mV/s.



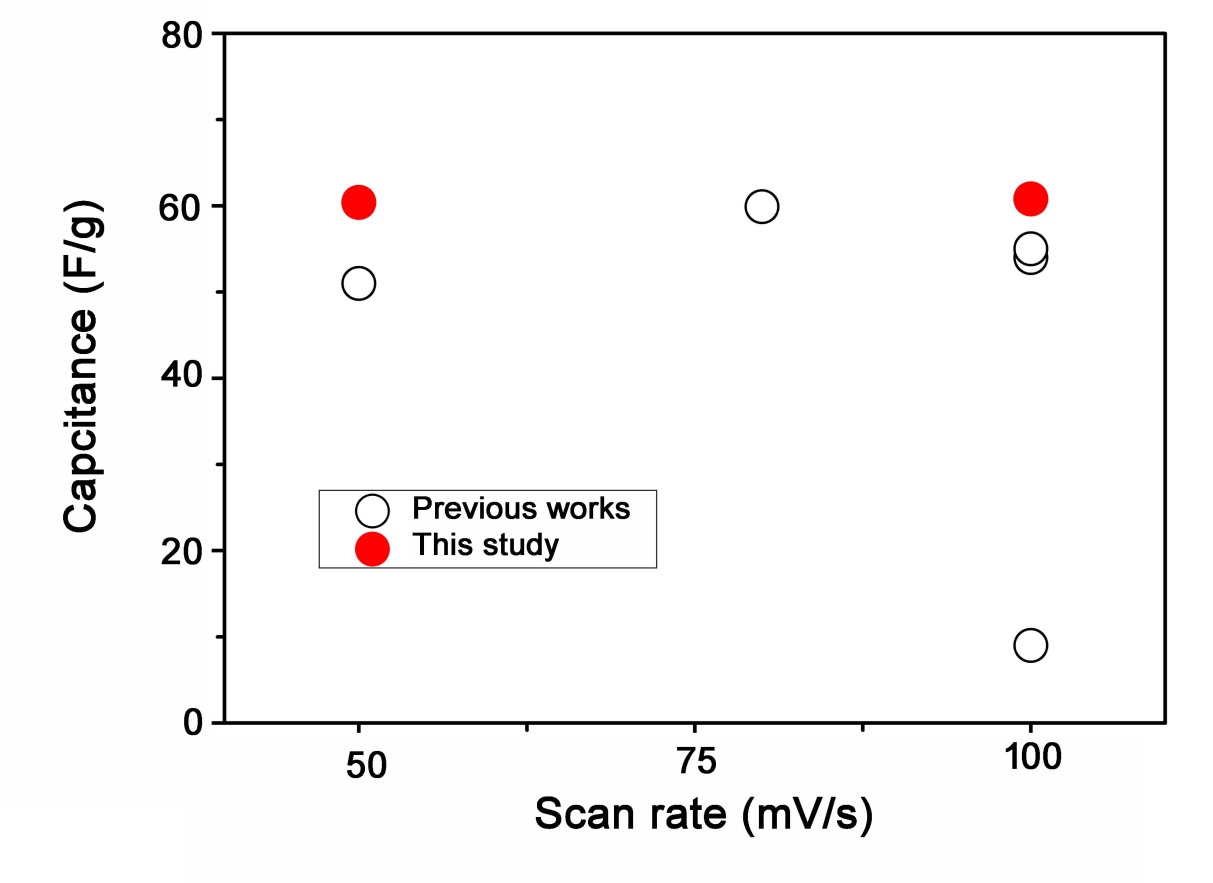
**Fig. S5.** CV curves at each 1000th cycle (tested up to 4000th cycles) of SAC (a), H-SAC (b), C-SAC-HCl (c), C-SAC-H3PO4 (d), and C-SAC-H2O2 (e) with a scan rate of 100 mV/s.



**Fig. S6.** XPS analyses of (a) SAC, (b) H-SAC, (c) C-SAC-HCl, (d) C-SAC-H3PO4, and (e) C-SAC-H2O2 [4]. Surface concentration changes (from C1 peak) based on the XPS areas (f).

**Table S1.** Relative concentration of the different groups in the C1s peak based on XPS analyses [4].

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Surface concentration (from C 1s peak) of (% at.):** | | | | | |  |
| **B.E. (eV)** | **283.6 - 284.2** | **284.6 - 284.8** | **285.5 - 285.6** | **286.7 - 286.8** | **288.8 - 289.0** | **290.6 - 291.1** | **Sum of oxygen functional groups (%)** |
| **(Assign)** | **(C-H)** | **(C-C)** | **(C-O**  **/C-O-C)** | **(C=O)** | **(O-C=O)** | **(π-π)** |  |
| **SAC** | 7.80 | 36.55 | 23.49 | 13.73 | 18.40 | - | 55.62 |
| **H-SAC** | 6.59 | 37.61 | 5.92 | 4.92 | 3.92 | 4.25 | 14.76 |
| **C-SAC- HCl** | 6.56 | 50.45 | 18.05 | 8.77 | 7.24 | 8.90 | 34.06 |
| **C-SAC-H3PO4** | 6.91 | 50.10 | 12.23 | 12.27 | 7.68 | 10.83 | 32.18 |
| **C-SAC-H2O2** | 7.87 | 50.77 | 14.18 | 7.69 | 7.37 | 12.12 | 29.24 |



**Fig. S7.** Comparison of specific capacitance from the previous reports and this works [5-9].

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