

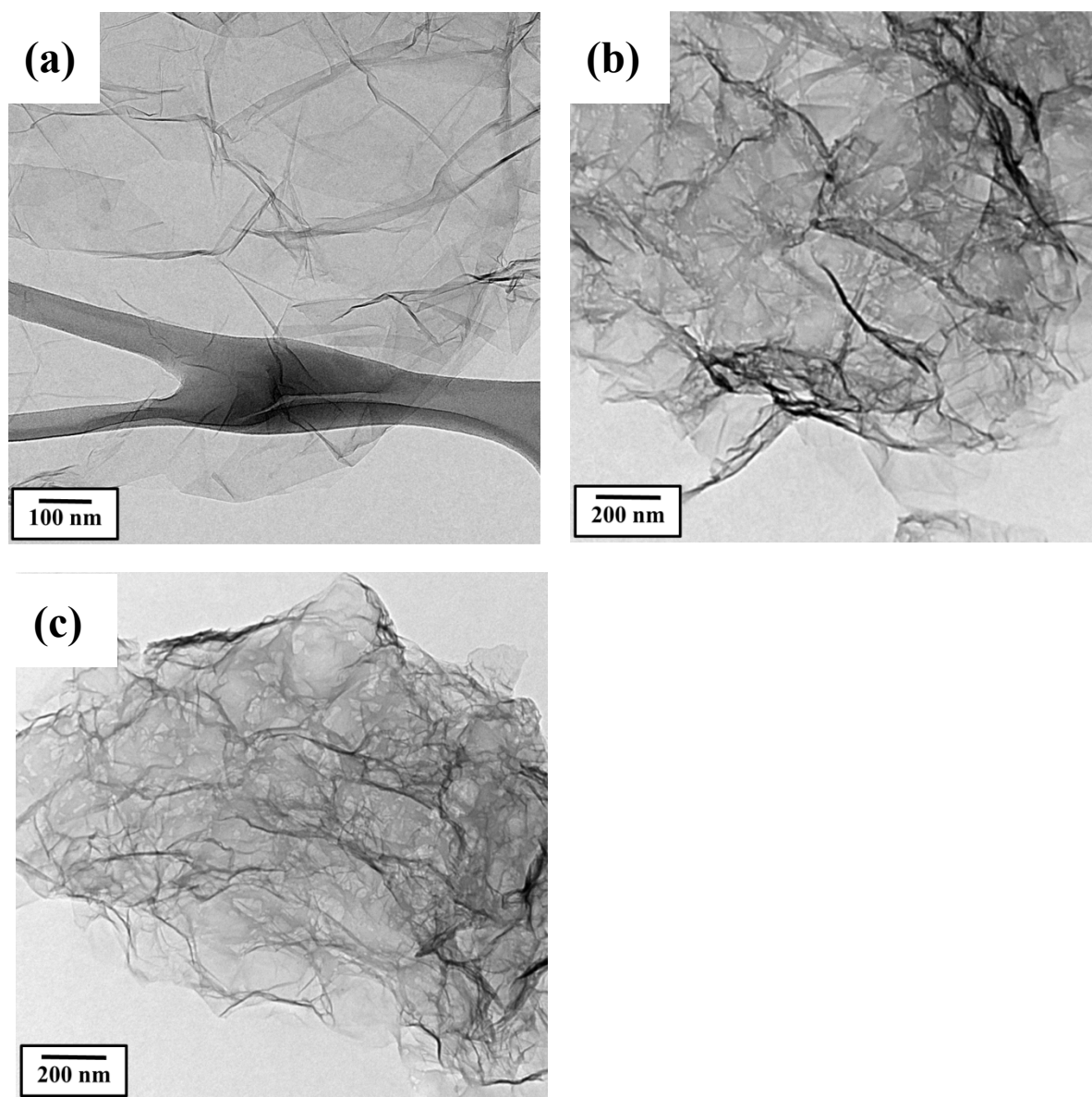


Figure S1. TEM micrographs of synthesized (a) GNS-300, (b) HGNS-300, and (c) HGNS-1100 samples.

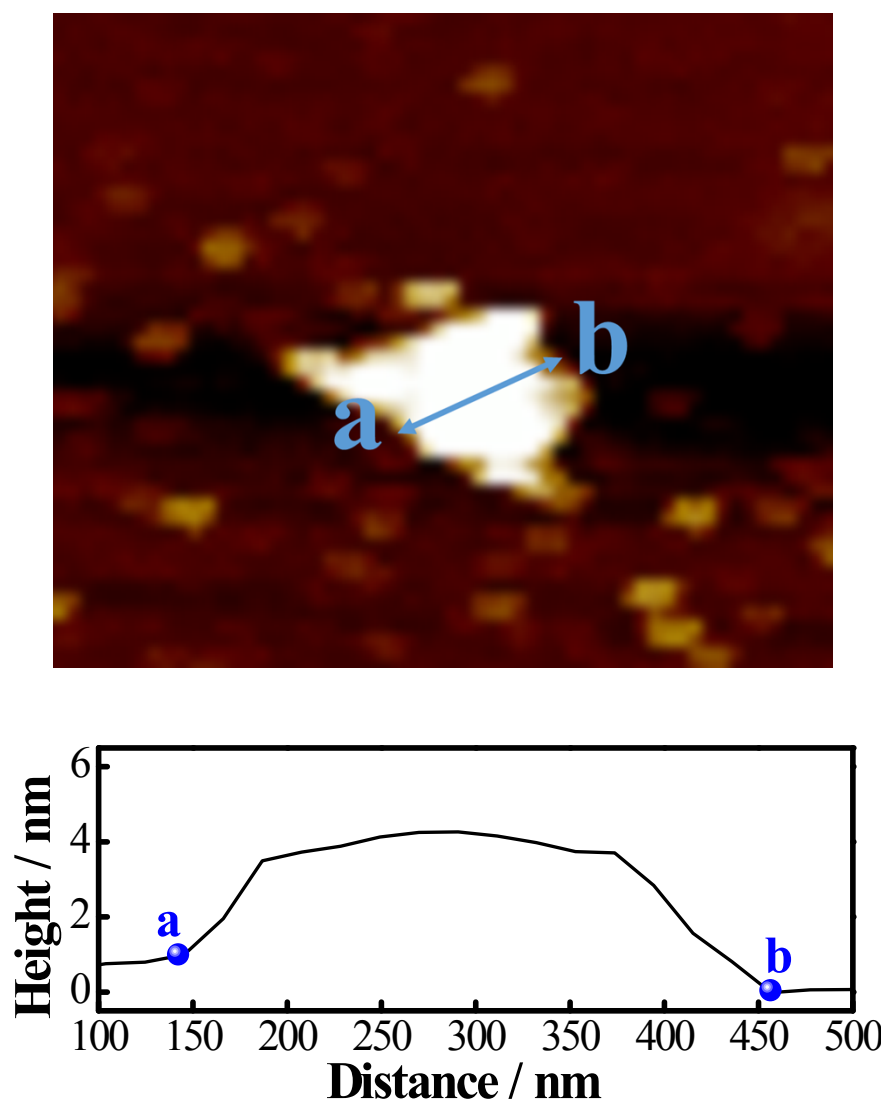


Figure S2. AFM analysis results of synthesized GNS-300 sample.

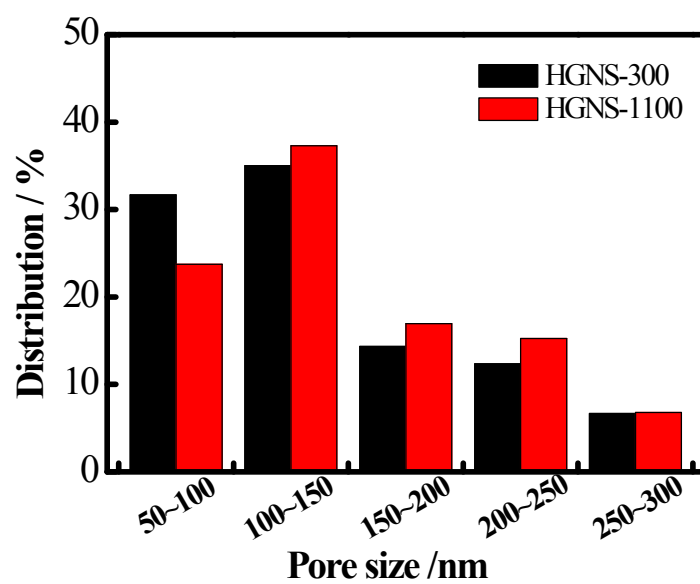
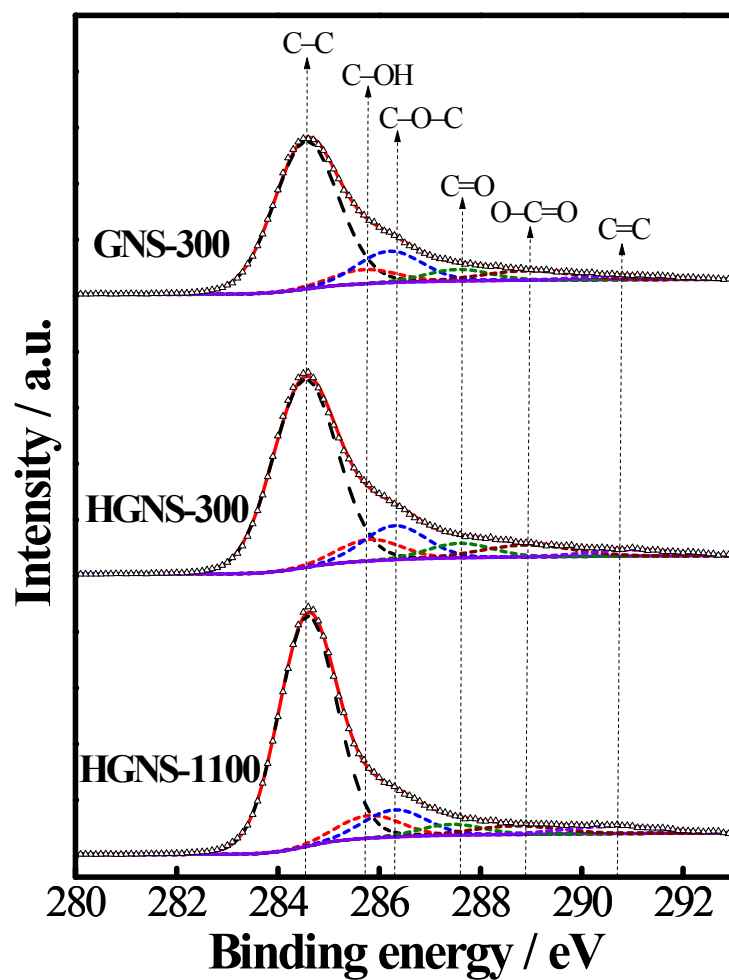


Figure S3. Comparison of pore size distribution of synthesized HGNS-300 and HGNS-1100 samples.



	C-C	C-OH	C-O-C	C=O	O-C=O	C=C
GNS-300	66%	8 %	12 %	5 %	6 %	3 %
HGNS-300	67 %	8 %	11 %	5 %	6 %	3 %
HGNS-1100	73 %	7 %	9 %	4 %	3 %	4 %

Figure S4. XPS C 1s spectra of synthesized GNS-300, HGNS-300, and HGNS-1100 samples.

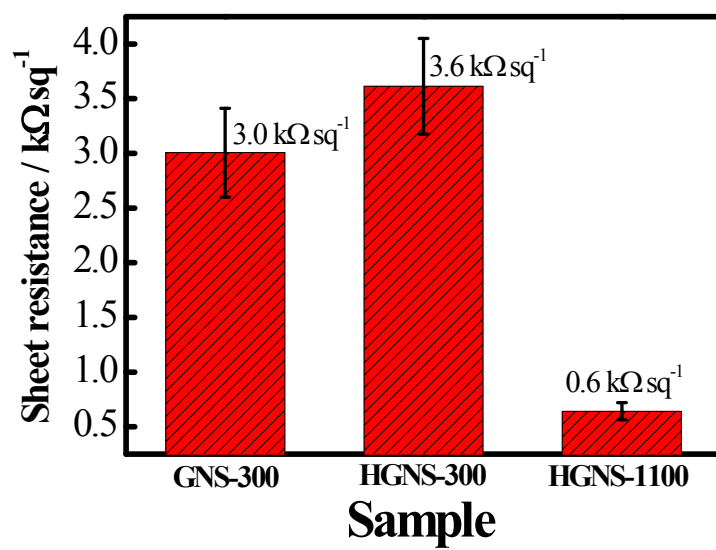


Figure S5. Sheet resistance values of synthesized GNS-300, HGNS-300, and HGNS-1100 samples.

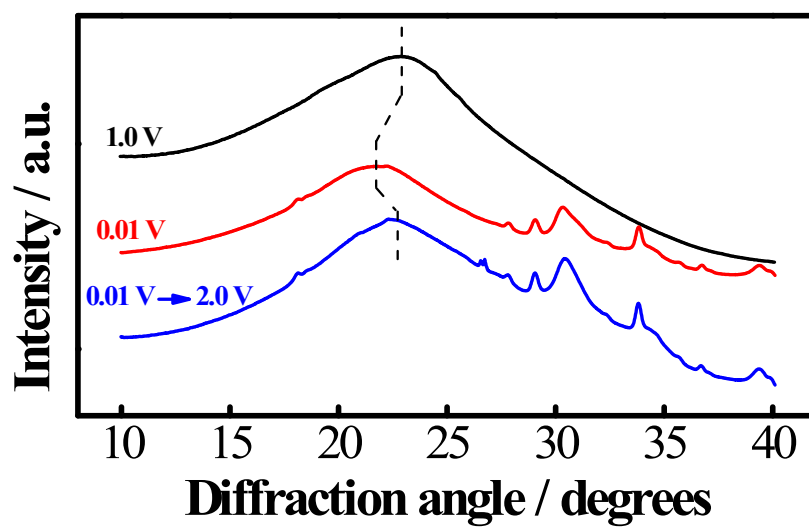


Figure S6. *Ex situ* synchrotron XRD patterns of GNS-300 electrode pre-polarized at various potentials for 1 h.

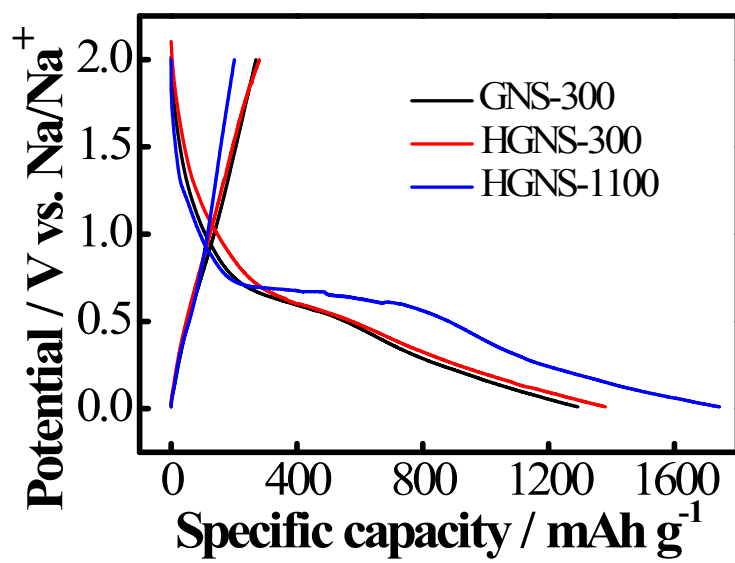


Figure S7. First-cycle charge-discharge curves of various GNS electrodes recorded at a current density of 0.03 A g⁻¹.

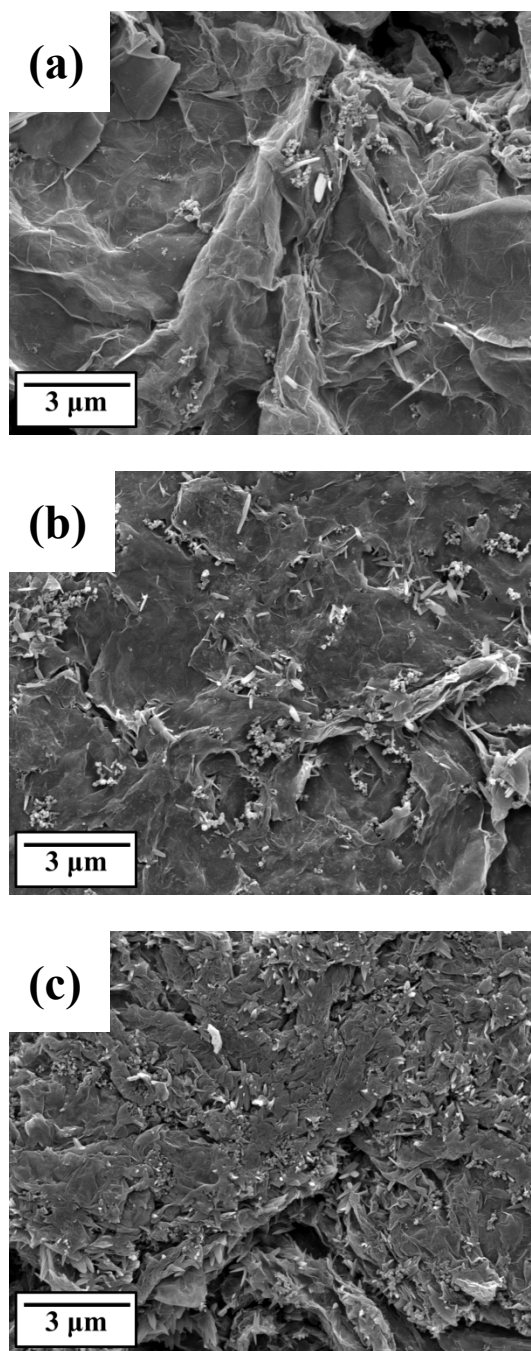


Figure S8. SEM micrographs of (a) GNS-300, (b) HGNS-300, and (c) HGNS-1100 electrodes after 500 charge-discharge cycles.