# Electronic Supplementary Information

**for**

# Atomic Layer Oxidation on Graphene Sheets for Tuning Their Oxidation Levels, Electrical Conductivities, and Band Gaps

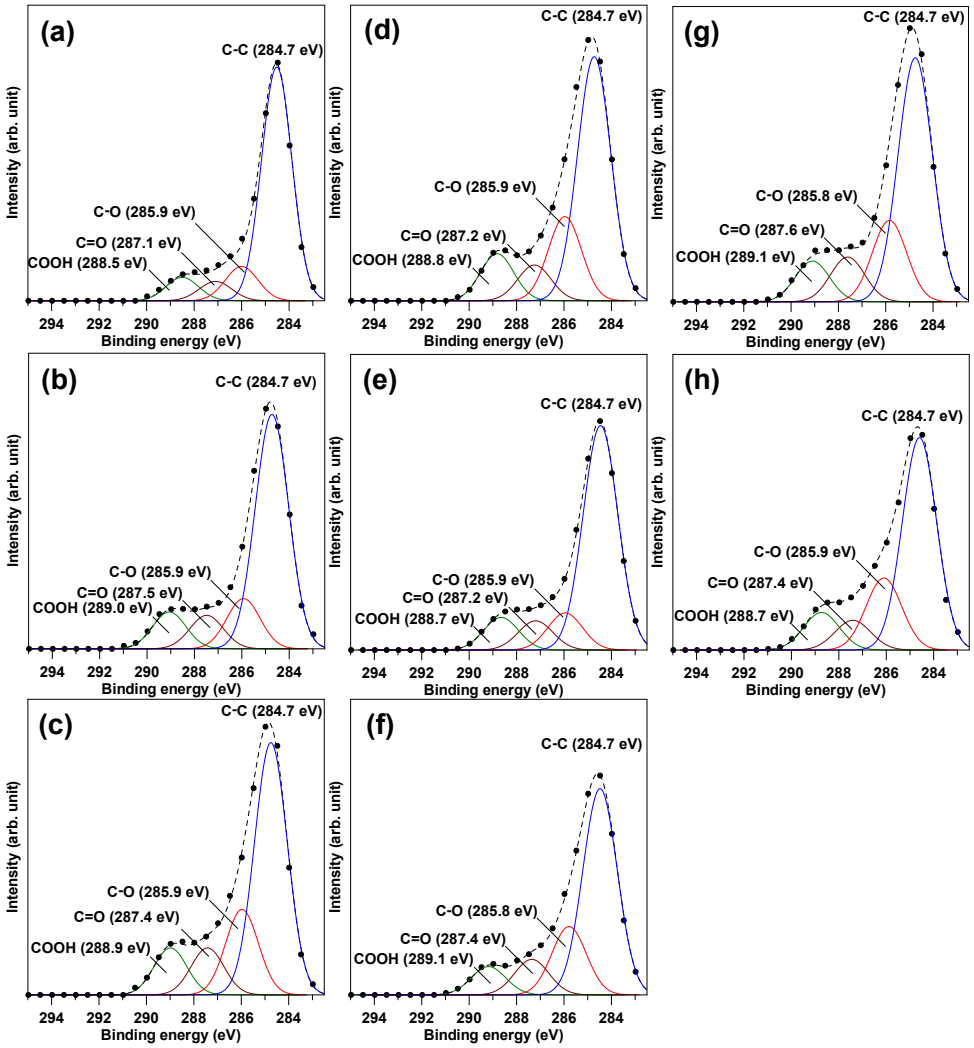


Figure S1. Typical XPS spectra of C 1s peak of different graphene nanosheets: (a) AGO, (b) AGO10, (c) AGO15, (d) AGO25, (e) AGO40, (f) AGO60, (g) AGO75, and (h) AGO100, deconvoluted by symmetric Gaussian function.

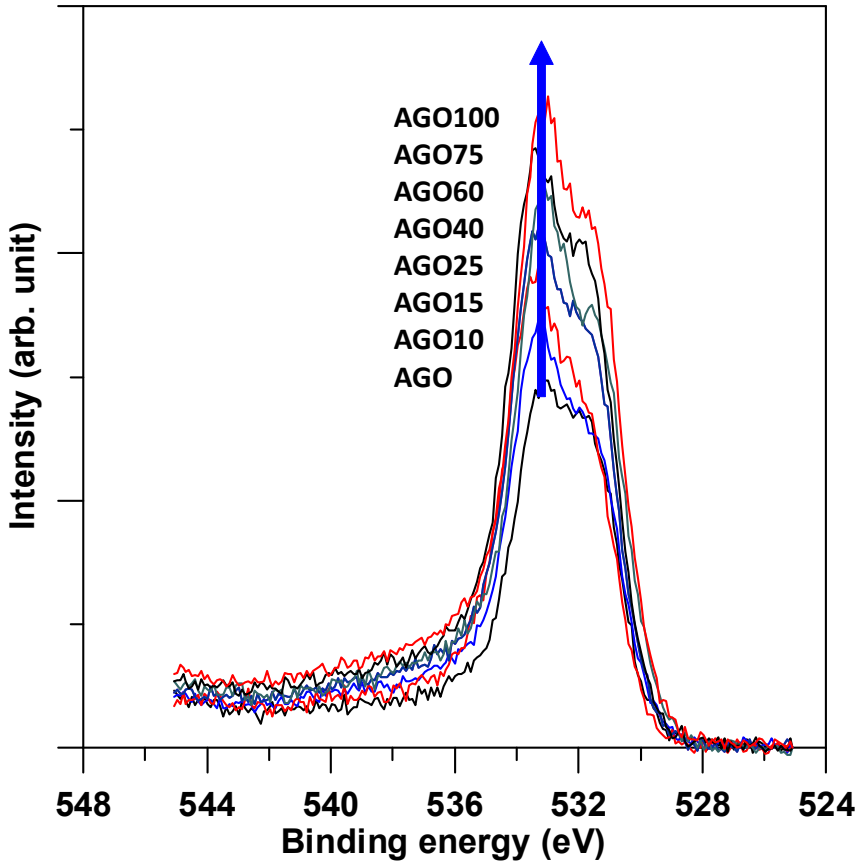


Figure S2. XPS spectra of O 1s peak of different graphene nanosheets: AGO, AGO10, AGO15, AGO25, AGO40, AGO60, AGO75, and AGO100.

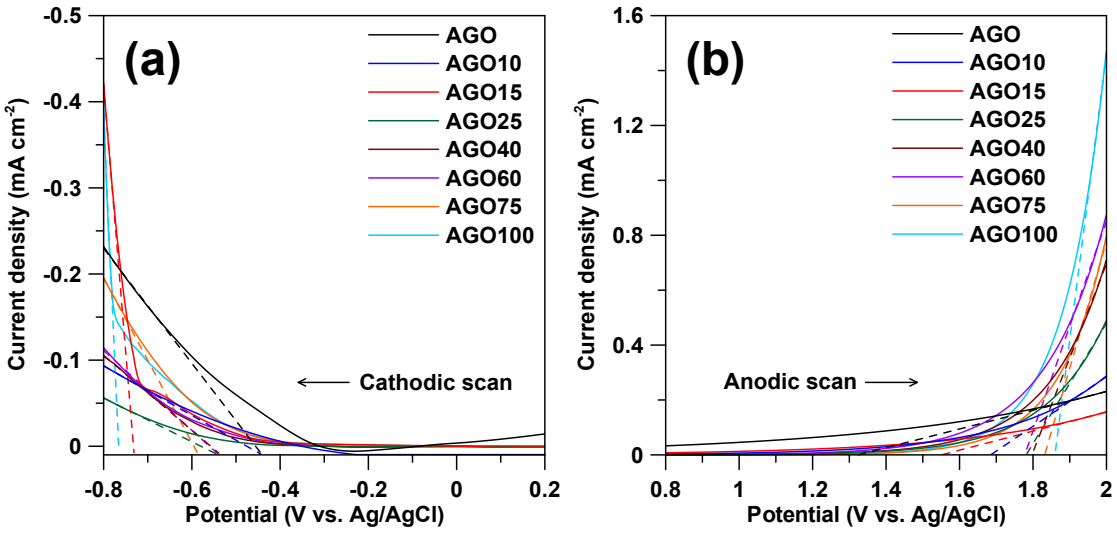


Figure S3. (a) Cathodic and (b) anodic scan of various graphene electrodes, using a linear scan rate of 10 mV $s^{-1}$ in acid electrolyte.

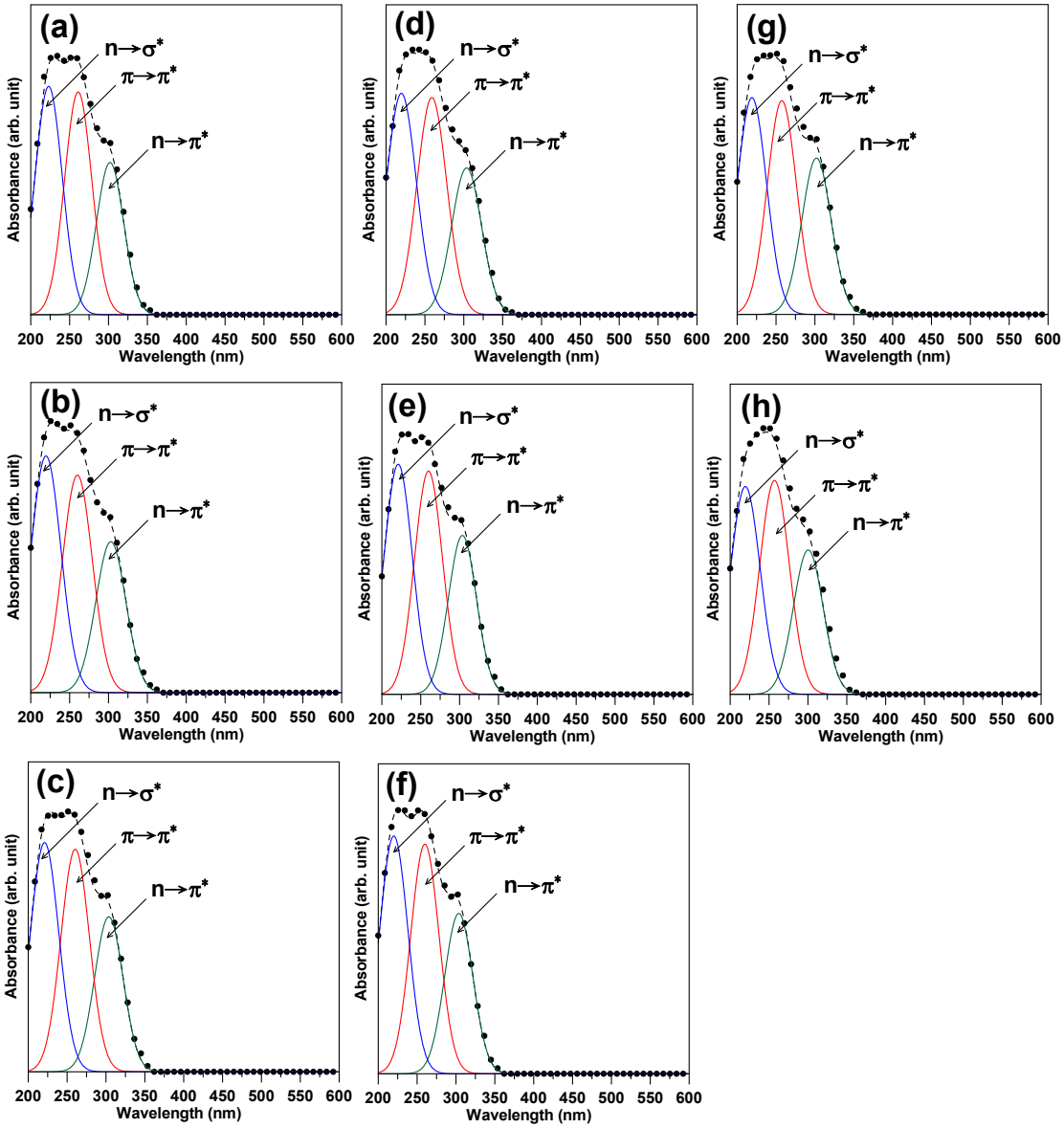


Figure S4. UV-visible absorption spectra of different graphene quantum dots: (a) AGO, (b) AGO10, (c) AGO15, (d) AGO25, (e) AGO40, (f) AGO60, (g) AGO75, and (h) AGO100, deconvoluted by symmetric Gaussian function.

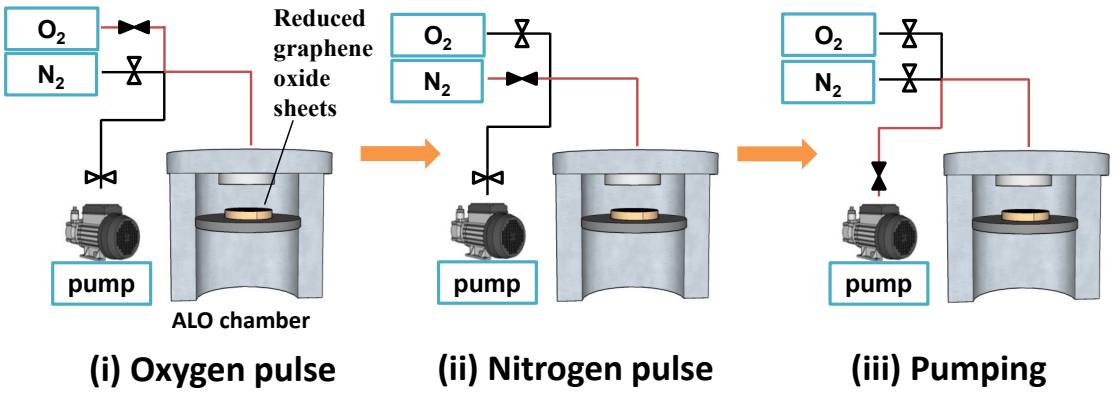


Figure S5. Schematic illustration for the ALO process involving (i) $O_2$ pulse, (ii) $N_2$ pulse, and (iii) pumping step.

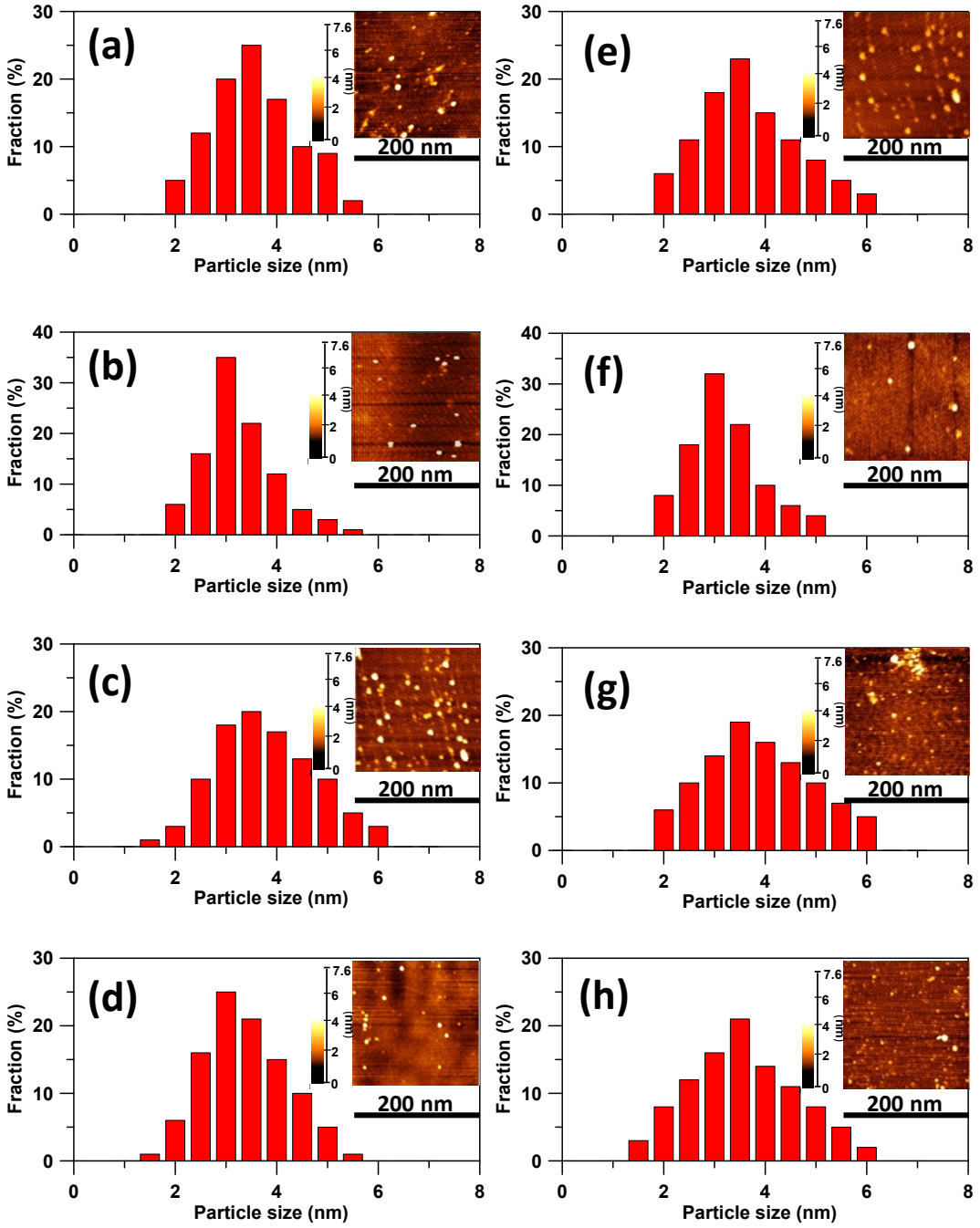


Figure S6. Particle size distributions of different samples: (a) AGO, (b) AGO10, (c) AGO15, (d) AGO25, (e) AGO40, (f) AGO60, (g) AGO75, and (h) AGO100, determined by AFM observation.