Electronic supplementary information (ESI)

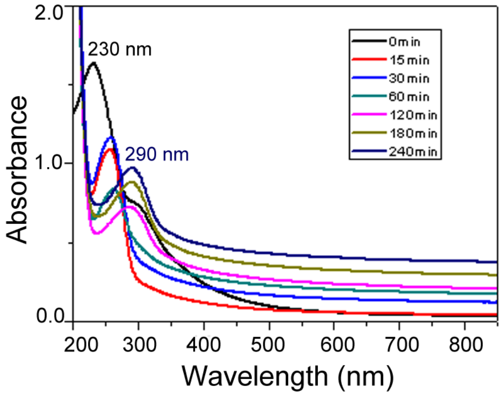

Figure S1. UV-vis absorption spectra of aqueous dispersions containing CRG, PVP, and L-AA acquired at different reaction time. The adsorption peak of GO dispersion redshifted from 230 nm to 290 nm after 4 hours reduction, and the absorption in the whole wavelength range increased during the reaction process suggesting that the conjugated sp^2 network of CRG/PVP is partly restored.[1, 2]

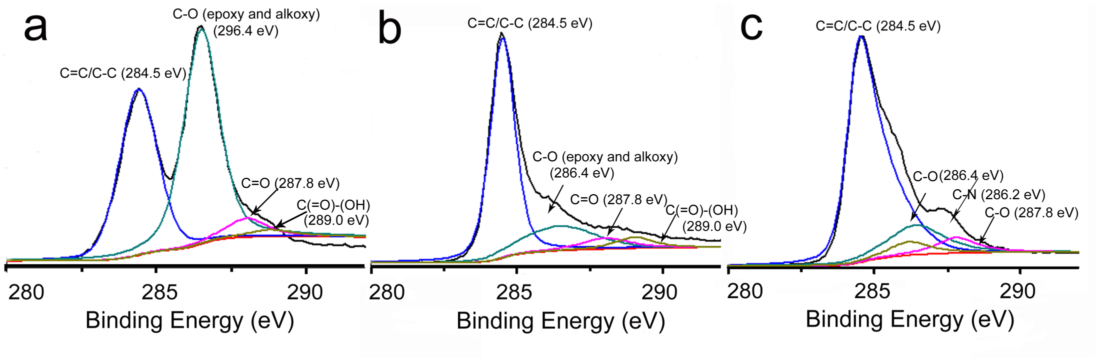

Figure S2. X-ray photoelectron spectroscopy (XPS) spectra in C 1s of GO (a), bare CRG (b) and CRG/PVP (c), showing that, after reduction, the C 1s peaks of oxygen containing groups decreased remarkably which suggests that the oxygen containing groups were removed readily.[1]

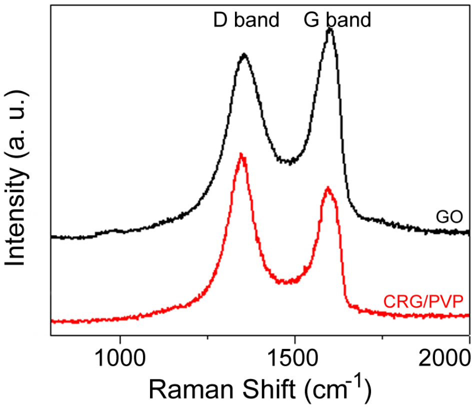

Figure S3. Raman spectra of GO and CRG/PVP. The D band at ~1350 cm^{-1} is the E_{2g} mode of sp^2 carbon atoms, and the G band at ~1600 cm^{-1} is the symmetry A_{1g} mode. The ratio of D/G intensity increased after the GO was converted to CRG/PVP revealing that GO was reduced by L-AA.[1, 3]

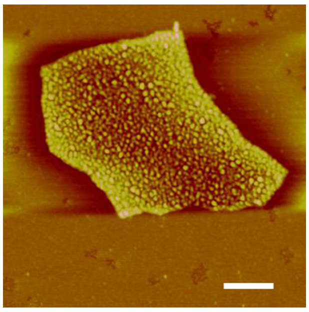

Figure S4. A tapping mode AFM image of CRG/PVP sheets after being kept in a basic aqueous solution with pH 10 for 12 hours. The scale bar equals 250 nm.

Preparation of GO

Graphene oxide was prepared using nature graphite powders as raw material through a modified Hummers method.[4, 5] Briefly, 2 g of graphite and 1 g of sodium nitrate were put into a flask cooled at 0 °C. Then, concentrated H_2SO_4, 50 mL, was added to the mixture. The mixture was stirred for 30 min at 5 °C. Subsequently, $KMnO_4$ (7 g) was added to the reaction system step-wisely over 1 hour, meanwhile the temperature of the mixture was kept below 20 °C. The temperature of the reaction system was then raised to 35 ^{o}C and stirred for 2 hours. Afterwards, 90 mL of deionized water was slowly added into the paste like product, and the temperature of the reaction system jumped to 70 ^{o}C instantly. Finally, 7 mL of 30 % H_2O_2, and 55 mL of deionized water were poured into the reaction system resulting in the formation of bright yellow suspension. The solid product, graphite oxide, was separated from the reaction mixture by filtration. The yellow-brown solid powders were washed for three times with diluted HCl (3 %), and then dispersed in deionized H_2O. Exfoliation of graphite oxide was approached by sonicating the graphite oxide in water at room temperature for 1 hour generating homogeneous graphene oxide dispersions.

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