Supporting Information

Environmentally friendly synthesis of graphene-silver composites with surface-enhanced Raman scattering and antibacterial activity via reduction with L-ascorbic acid/water vapor

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Materials Characterization

UV-Vis absorption spectra were recorded on a UV-2600 UV-vis spectrometer (Shimadzu, Japan). Fourier-transform infrared spectroscopy (FT-IR) spectra were obtained on a FT-IR spectrometer IR Prestige-21 (Shimadzu, Japan). X-ray diffraction (XRD) analyses of the GO, RGO and RGO/Ag samples were carried out on a D-8 ADVANCE X-ray diffractometer (Bruker AXS, Germany) with graphite monochromatized Cu Kα irradiation (λ = 1.54 Å) with a voltage of 40 kV and current of 40 mA. Thermogravimetric analysis (TGA) was conducted in a continuous nitrogen flow with a flow rate of 150 mL min^{-1} and a heating rate of 10 °Cmin^{-1} from room temperature to 850 °C using a SDT Q600 (TA, America). X-ray photoelectron spectroscopy (XPS) measurements were taken in a ESCALAB 250 (Thermo Fisher

Scientific, America) using a monochromatic Al-Kα X-ray source at 100 W. The surface and cross-section images of the RGO/Ag films were characterized by scanning electron microscope (SEM) QUANTA 200 (FEI, America). The equilibrium contact angles (CA) were measured by a DSA 100 (KRÜSS, Germany) contact angle meter at ambient temperature. The morphology and microstructures were observed by transmission electron microscope (TEM) H-800 (HITACHI, Japan) at an accelerating voltage of 100 kV. Atomic force microscopy (AFM) images were taken on a Mutimode 8 Nanoscope V system (Bruker, USA) in peak force tapping mode. Electrical measurements were performed using a four-point probe measurement station (Jandel RM3-AR Test Meter with Multiheight Probe attachment), and the average of three data points per sample was recorded.

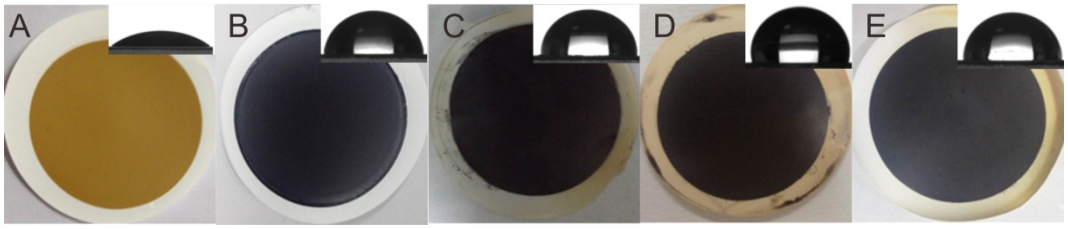

Figure S1. Pictures of (A) GO, (B) RGO, (C) Ag2G1, (D) Ag5G1 and (E) Ag10G1 films, and the equilibrium water contact angles: 37.2±0.5°, 88.8±0.5°, 98.2±0.5°, 106.5±0.5° and 97.3±0.5°, respectively.

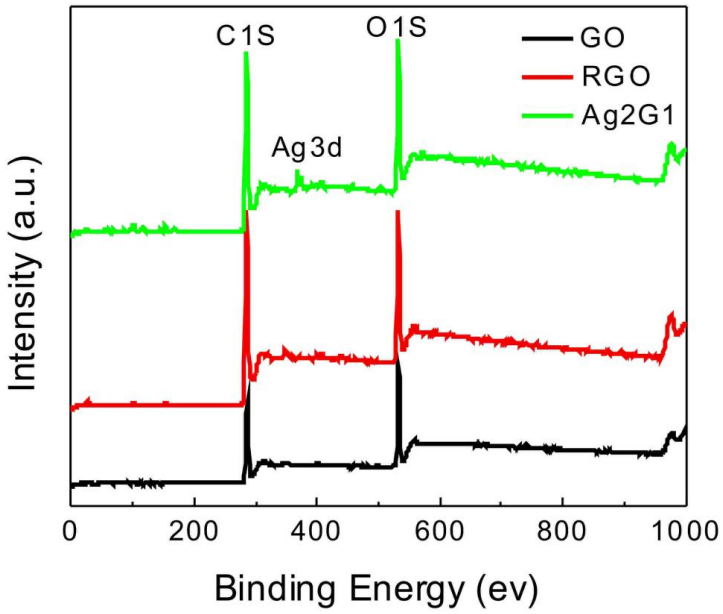

Figure S2. XPS survey spectra of the as-prepared GO and RGO and Ag2G1 composites.

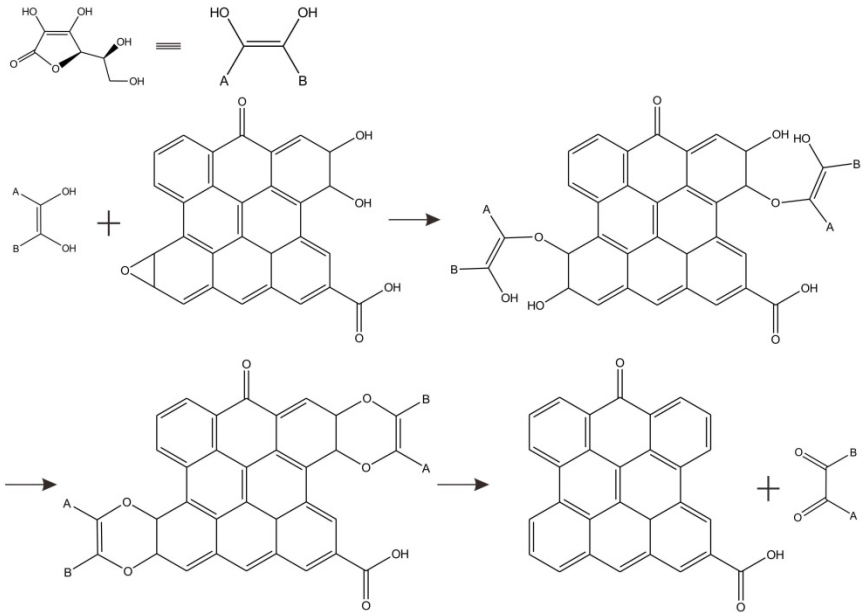

Figure S3. Reaction pathway for the chemical reduction of GO with L-AA.