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Photoassisted Electrochemical Biosensing Using Graphene Oxide Nanoribbons

We have investigated graphene oxide nanoribbons (GONRs) for a variety of applications since 2011. [1-11] This conference paper presents a photoassisted biosensor based on GONRs. Images and graphitic structures of GONRs were monitored by transmission electron microscopy and Raman spectroscopy, respectively. The C1s spectra and energy bandgaps of GONR were collected by using X-ray photoelectron spectroscopy as well as UV-vis spectroscopy. Finally, the GONRs were adopted to modify the screen print carbon electrodes (SPCE) for the electrochemical detection of uric acid (UA) with the help of AM 1.5 light source in the power density of 100 mW/cm². In cyclic voltammetry analyses, all Faradaic currents for UA oxidation increased more than 20%. In the low concentration region, the photocurrent sensitivity was about 4 times higher than that of dark current. Therefore, the significantly improved UA sensing was demonstrated by photoassisted electrochemical detection by adopting GONRs.

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Figures

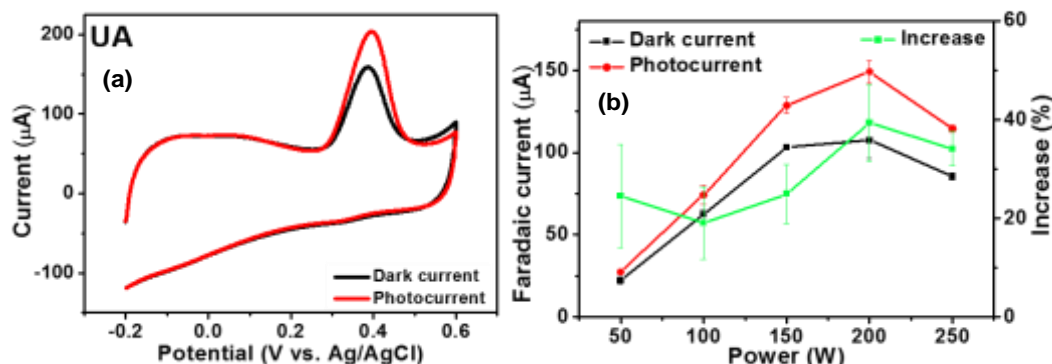


Figure 1: (a) Cyclic voltammograms in the electrolyte containing 0.1 M PBS + 0.3 mM UA using GONR(200 W). (b) Faradaic currents for photoassisted UA oxidation for GONRs unzipped under different microwave powers.