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Electrochemical Microelectrodes Modified by Self-Assembled Stacked Graphene Nanofibers

Yuhua Yu, Xiaosen Chai, Chun Xu and Jia Zhou*

ASIC and System State Key Lab, Department of Microelectronics, Fudan University,
220 Handan RD, Shanghai 200433, China

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In this study, we construct stacked graphene platelet nanofibers (SGNFs)/self-assembled monolayer (SAM)/Au electrodes for electrochemical detection by the controllable adsorption of SGNFs onto a SAM of *n*-octadecyl mercaptan ($C_{18}H_{37}SH$) at Au electrodes. The resulting SGNF/SAM/Au electrode demonstrates superior electrochemical properties over both bare Au and graphite/SAM/Au electrodes. The results of Raman spectroscopy and scanning electron microscopy (SEM) images show that SGNFs have a higher edge-plane density than that of graphite. Cyclic voltammetry (CV) curves indicate that the SGNF/SAM/Au electrode has a higher peak current than the Au electrode and graphite/SAM/Au electrode. For the SGNF/SAM/Au electrode, the relationship between its peak current and the square root of the scan rate is linear with a fitting slope of 10.638 and correlation coefficient of 0.9968. It shows an excellent characteristic of Faradic current and thus a high signal-to-noise ratio (SNR) in electrochemical detection. The big peak current and high SNR provide a potentially high sensitivity for electrochemical sensors.

*Corresponding author: e-mail: jia.zhou@fudan.edu.cn