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Journal of Electroanalytical Chemistry
Volume 855, 15 December 2019, 113490

The first observation of electrochemistry of graphene/cysteine/copper composite

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https://doi.org/10.1016/j.jelechem.2019.113490
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Highlights

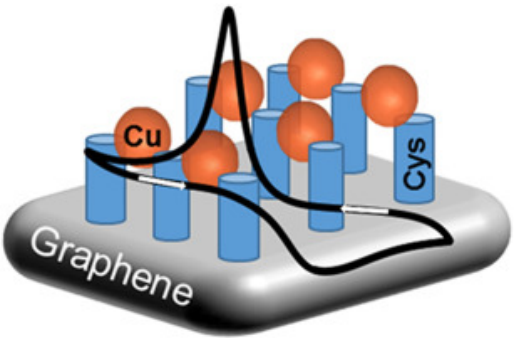
- We characterizated electron transfer involving Cu/cysteine complexes immobilized on graphene using electrochemical approach.
- We studied effect of various components on electrochemical signal of copper/amino acid/graphene electrode.

Abstract

A systematic characterization of electron transfer reaction involving copper amino acid complexes is an interesting task in connection with a biological activity of copper. We immobilized copper on a self-assembled monolayer of different types of cysteines grown on graphene electrode. Copper-amino acid complexes were characterized by electrochemical methods such as cyclic voltammetry. Influence of pH of electrolyte, hydrocarbon chain length of cysteine and concentration of copper chloride solution used for immobilization of copper on amino acid self-assembled monolayer/graphene composite, on electron transfer process were tested. Strong signal of copper (II) reduction was obtained in the phosphate buffer solution at pH 6.2 and no significant change was observed after change the hydrocarbon chain length on electrochemistry of graphene/cysteine/copper composite.

Apart from fundamental interest, Cu^{2+} containing device could be interesting to study as effective copper ion sensors/catalysts on their own. One more aspect of this paper is exploitation of graphene as a supporting substrate for self-assembled monolayers.

Graphical abstract



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Keywords

Self-assembled monolayer; Graphene; Cysteine; Cyclic voltammetry

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