

Laser-scribed pencil lead electrode fabrication and their application in flow injection analysis (FIA)

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Highlights

Modification of pencil lead surface by laser heat treatment; Production of moldable, Sensitive and low-cost electrode; Determination of indapamide by FIA.

Abstract

Laser heat treatment produces conductive graphene-on-graphite surfaces, improving their electrochemical performance, producing low-cost, and sensitive, sensors quickly and environmentally friendly. Improvement was assessed by electrochemical tools such as cyclic voltammograms and electrochemical impedance spectroscopy using $[\text{Fe}(\text{CN})_6]^{3-/4-}$ and dopamine as redox probes. The electrochemical results demonstrated that a treated surface resulted in improvement in electron transfer and less resistance to charge transfer. The resulting material was adequately characterized by Raman spectroscopy and scanning electron microscopy, where an irregular surface composed of crystalline graphite particles was observed. Furthermore, as a proof of concept, the detection of indapamide in a sample of synthetic urine by flow injection analysis was applied-Indapamide is a diuretic drug often used by athletes to change the urine composition to hide the consumption of prohibited substances in performance tests doping.

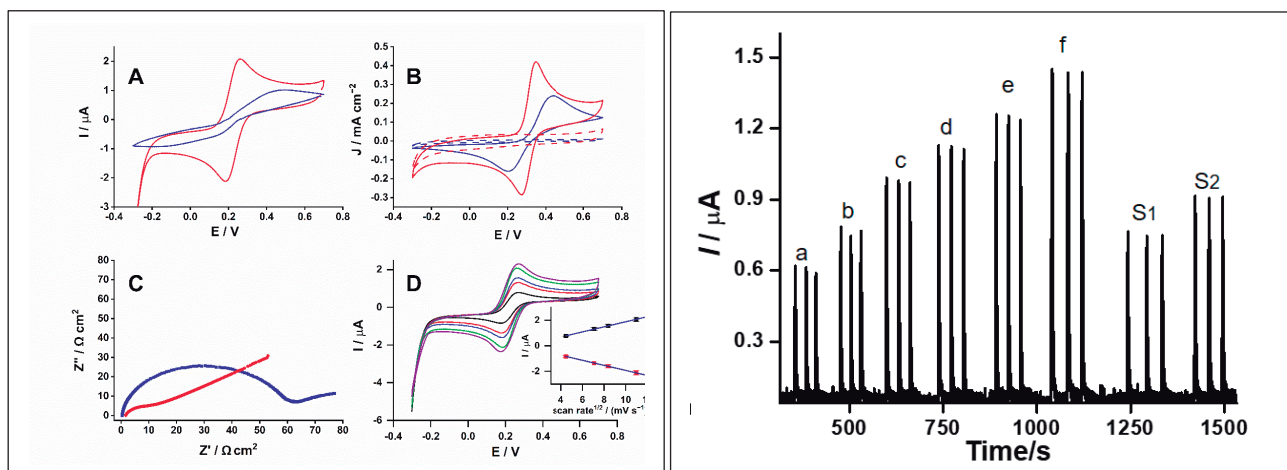


Figure 1 – Left: Cyclic voltammograms (CVs) and electrochemical impedance spectroscopy (EIS) recorded using non-treated (LNGr) (blue) and treated (LTGr) (red) H-type graphite; Right: Records of a series of injections of a solution containing indapamide.

Acknowledgments

