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Title: Comparative studies of hybrid functional materials based on different carbon structures decorated with nano-magnetite. Suitable application as platforms for enzyme-free electrochemical sensing of hydrogen peroxide

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PII: S0925-4005(17)30582-8
DOI: <http://dx.doi.org/doi:10.1016/j.snb.2017.03.159>
Reference: SNB 22071

To appear in: *Sensors and Actuators B*

Received date: 30-1-2017
Revised date: 17-3-2017
Accepted date: 29-3-2017

Please cite this article as: L. Venosta, M.V. Bracamonte, M.C. Rodríguez, S.E. Jacobo, P.G. Bercoff, Comparative studies of hybrid functional materials based on different carbon structures decorated with nano-magnetite. Suitable application as platforms for enzyme-free electrochemical sensing of hydrogen peroxide, *Sensors and Actuators B: Chemical* (2017), <http://dx.doi.org/10.1016/j.snb.2017.03.159>

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HIGHLIGHTS

1. Different carbon substrates were used to prepare nano-magnetite/carbon hybrids.
2. The synthesized materials were fully characterized and used as catalysts in the electrocatalytic reduction of H₂O₂.
3. The deposition of nano-magnetite occurs mainly on the edges of graphite flakes.
4. A synergistic effect between the metal oxide and the carbon support.
5. The sensitivity of the proposed sensor (1.1 ± 0.1) $\times 10^5$ $\mu\text{A M}^{-1} \text{cm}^{-2} \text{mg}^{-1}$ and the LOD – 0.50 nM - are higher than the pristine materials alone.
6. The proposed sensors are suitable for real sample sensing applications.

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