Supporting information

Electrochemical characterization of magnetite (Fe_3O_4) nano-aggregates in acidic and alkaline solutions

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Calculation of the active particles percentage.

The actual percentage of electroactive particles was evaluated from the ratio between the experimental charge, from the CV analysis (in A·s) and the theoretical charge, from the loading of particles onto the GC electrode for the supported case or into the solution for the dispersed case. The theoretical charge is calculated according to the Faraday law, here reported as:

$$Q_{th} = mnF \qquad \text{Eq. (S1)}$$

Where Q_{th} is the charge in A·s, m is the number of moles of active particles, n is the number of electrons exchanged in the reaction ($n = 1$, [1]) while F is the Faraday constant in C mol^{-1}.
The experimental charge on the other hand is calculated by the integration of the anodic peak from the CV analysis, as follows:

$$Q_{exp} = \frac{1}{v}\int_{V_i}^{V_f} I(V)dV \qquad \text{Eq. (S2)}$$

Where Q_{exp} is the charge in A·s, v is the scan rate in V s^{-1}, V_i and V_f are the potential limitations for the integration of the peak in V and $I(V)$ is the instantaneous current in A.

1. K. Murugappan, D. S. Silvester, D. Chaudhary, and D. W. M. Arrigan, Electrochemical Characterization of an Oleyl-coated Magnetite Nanoparticle-Modified Electrode, *ChemElectroChem*, **1**, 1211–1218 (2014)

http://doi.wiley.com/10.1002/celc.201402012.