Supporting Information

Large-scale quantification of CVD graphene surface coverage

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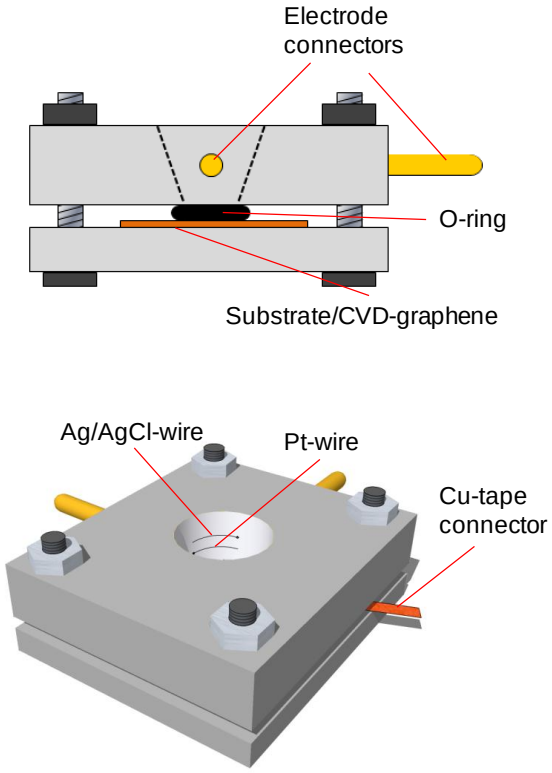

Fig. S1. Schematic of the electrochemical cell used for the measurements. It consists of a flat bottom part where the metal/CVD-graphene sample is placed; and an upper part having a conical hole which functions as reservoir. A rubber o-ring (I.D. = 4.5 mm; O.D. = 8.1 mm) and four screws ensure a secure and sealed chamber to be filled with the measurement solution for a total surface of 17 mm^2 for the CVD-Graphene sample to be examined. The metal/CVD-graphene acts as the working electrode while a Pt and Ag/AgCl wire immersed in the solution act as the auxiliary and the reference electrode, respectively. The size of the o-ring defines the portion of the CVD-graphene surface investigated. A Cu tape was used to ensure the electrical connection between the metal/CVD-graphene and the voltammetric instrument. Electrochemical treatment and measurements were performed using NaOH 0.1 M as background electrolyte. All electrochemical potentials in this paper are stated versus Ag/AgCl reference electrode.

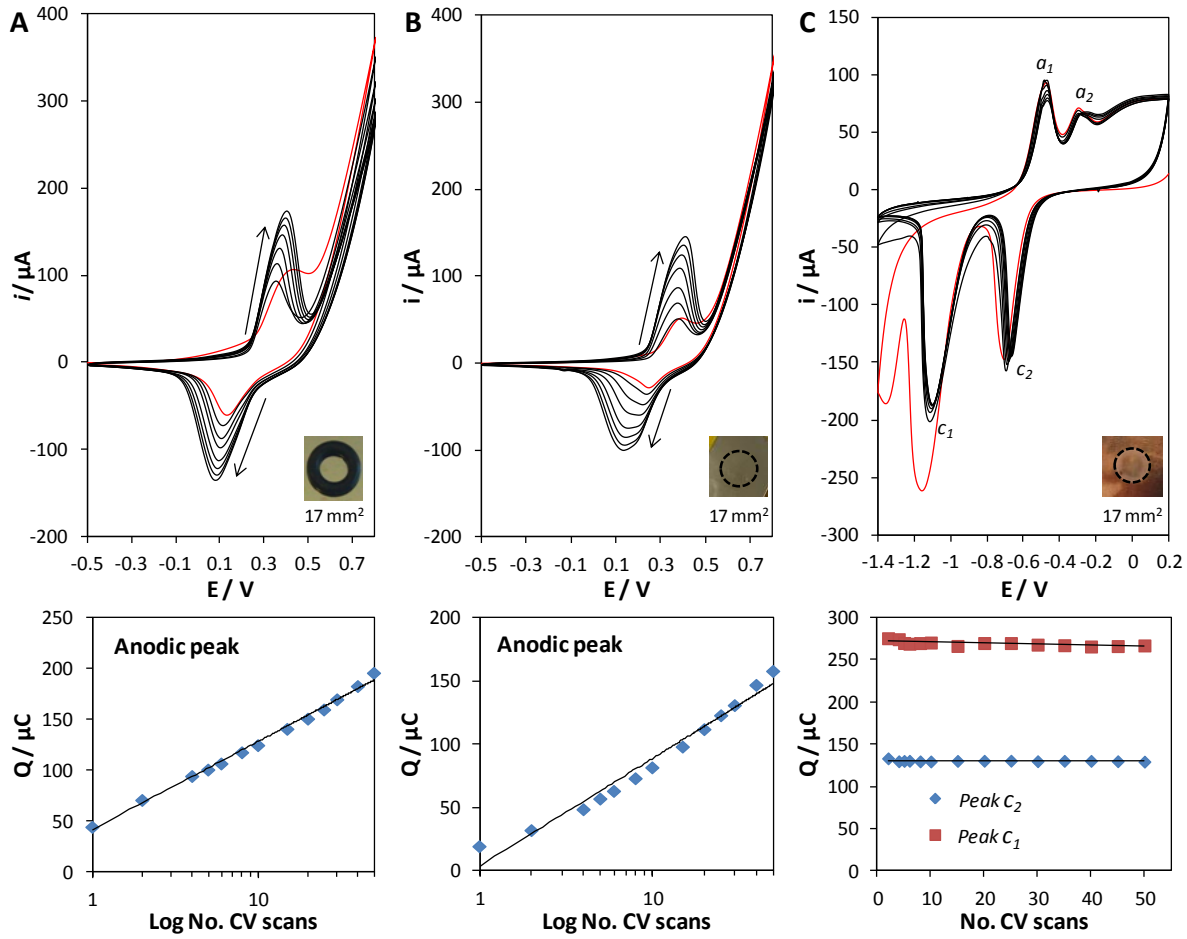

Fig. S2. Successive cyclic voltammograms of (**A**) bare $Si/SiO_2/Ni$, (**B**) bare Ni foil and (**C**) bare Cu foil in 0.1 M NaOH. Plots of the charge (µC) vs. the number of CV scans are presented in the lower part of the figure. The charge involved in the anodic oxidation of the $Ni(OH)_2$ to NiOOH (Fig. S2A and B) increases linearly with the natural logarithmic of the number of CV scans. On the contrary, the electrochemical signal recorded for Cu foil reaches a steady contour after a few CV scans.

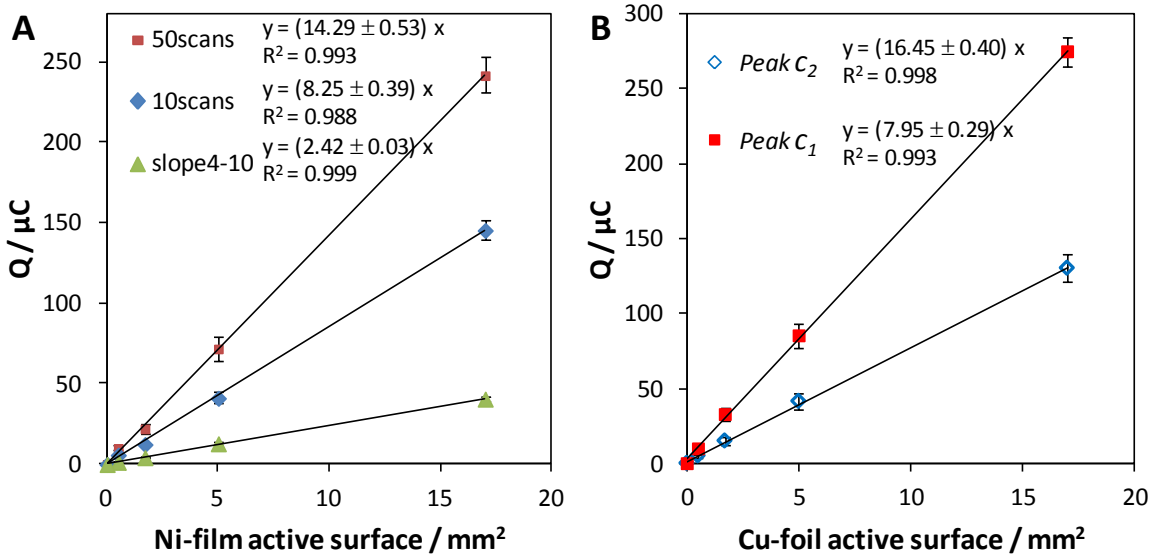

Fig. S3. (**A**) Different plots correlated to the Ni film active surface area. A linear relationship can be obtained taking into consideration the charge involved in the anodic oxidation of $Ni(OH)_2$ after 50 CV scans (red square) or after 10 CV scans (blue square). Considering the CV scans from 4 to 10, a linear regression between the charge and the Log of the number of scans (4-10) can be obtained. The slope of such linear regression is then linearly proportional with the active Ni metal surface (green triangle). (**B**) Plots correlated to the Cu active surface. A linear relationship can be obtained considering the charge involved in the cathodic reduction process C_1 (red square) or C_2 (blue square). It can be seen that in all cases a perfectly linear regression is generated, giving the opportunity to choose the most appropriate measurement method.

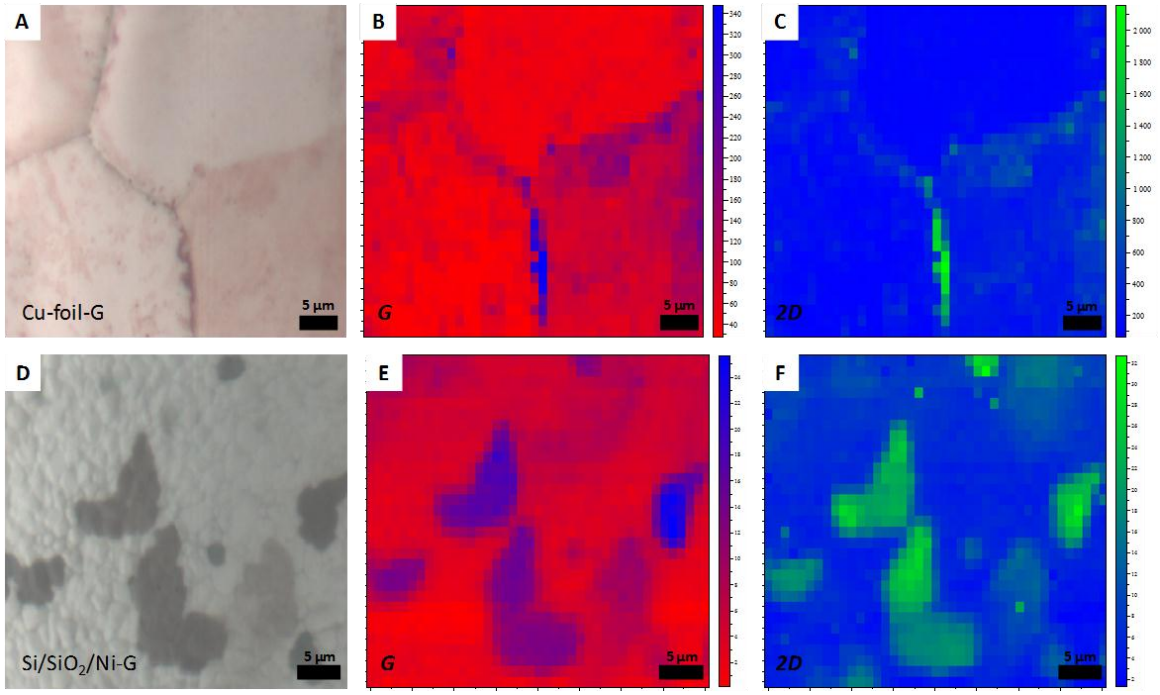

Fig. S4. Optical microscopy image of a region of Cu-Graphene sample (**A**) or Si/SiO_2/Ni-Graphene sample (**D**) with the corresponding Raman maps generated according to the G band (1550-1650 cm^{-1}) (**B** and **E**) or the 2D band (2650-2750 cm^{-1}) (**C** and **F**). Laser: 514 nm, 100x objector, ~500 nm spot size.

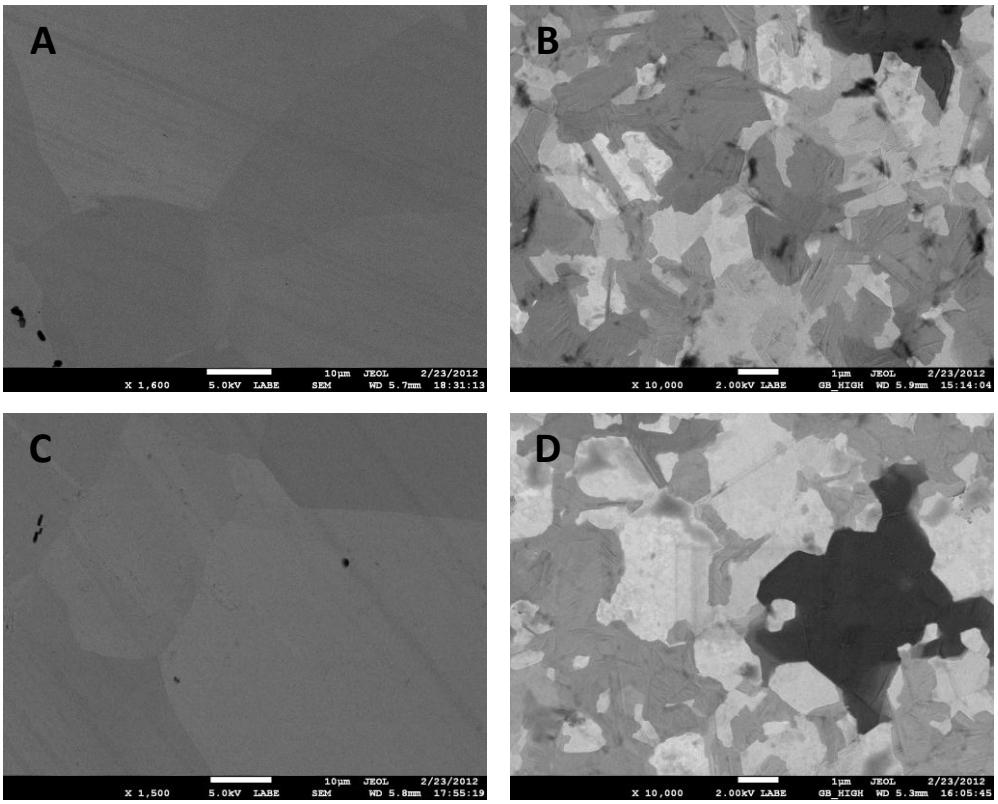

Fig. S5. Scanning electron microscopy images of Cu-Graphene sample as received (**A**) and after 10 cyclic voltammetric scans in NaOH (**C**). Si/SiO_2/Ni-Graphene sample as received (**B**) and after 20 cyclic voltammetric scans in NaOH (**D**).

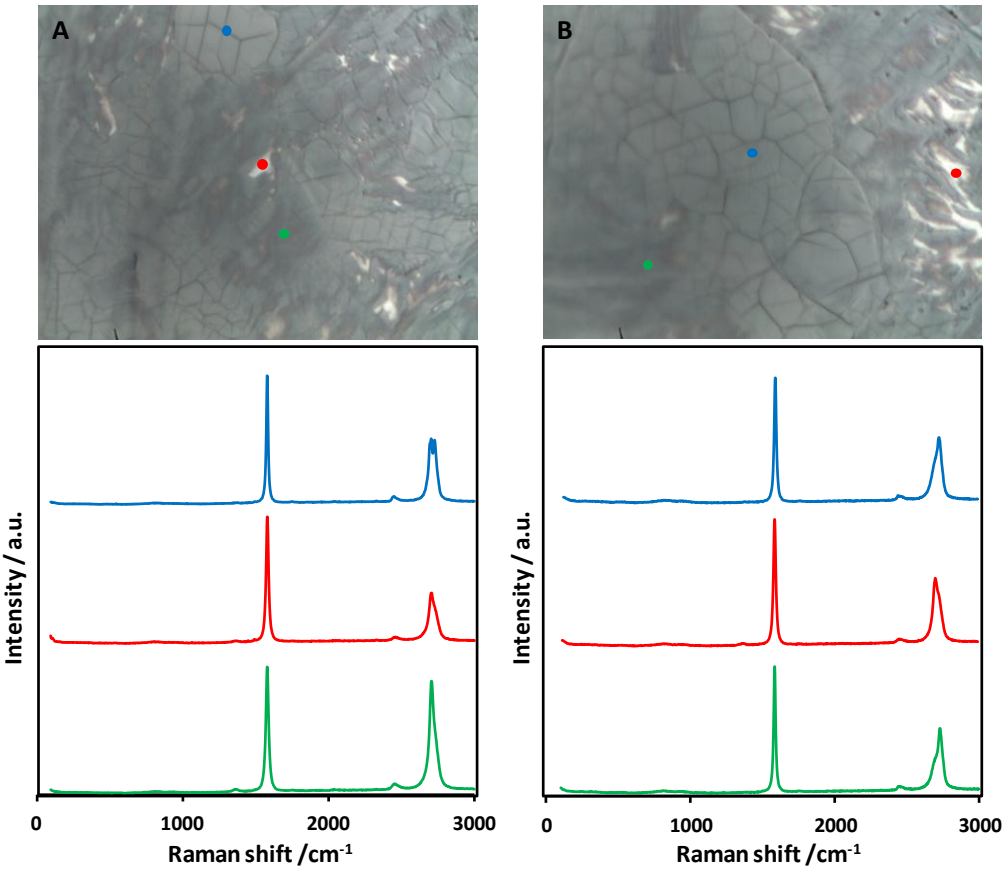

Fig. S6. Optical microscopy images and corresponding Raman spectra of Ni-foil-ML-Graphene samples as received (**A**) and after 50 cyclic voltammetric scans in NaOH (**B**).