# Efficient fluorescence quenching in electrochemically exfoliated graphene decorated with gold nanoparticles

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**Abstract** (Arial 10)
High surface area graphene sheets were obtained by electrochemical exfoliation of graphite in acid media under constant potential conditions. Filtration and centrifugation processes played an important role in order to obtain stable dispersions in water. Scanning electron microscopy (SEM) and transmission electron microscopy (TEM) imaging revealed highly exfoliated crystalline samples of ~5 mm. Raman, FT-IR and XPS spectroscopy further confirmed the high quality of the exfoliated material. The electrochemically exfoliated graphene (EEG) was decorated with gold nanoparticles (AuNP) using sodium cholate (SC) as a buffer layer. This approach allowed for a non-covalent functionalization without altering the desirable electronic properties of the EEG. The AuNP-EEG samples where characterized with various techniques including absorbance and fluorescence spectroscopy. These samples displayed a fluorescence signal using an excitation wavelength of 290 nm. The calculated quantum yield for these samples was 40.04%, high compared to previous studies using solution processable graphene.

**References**

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**Figures**

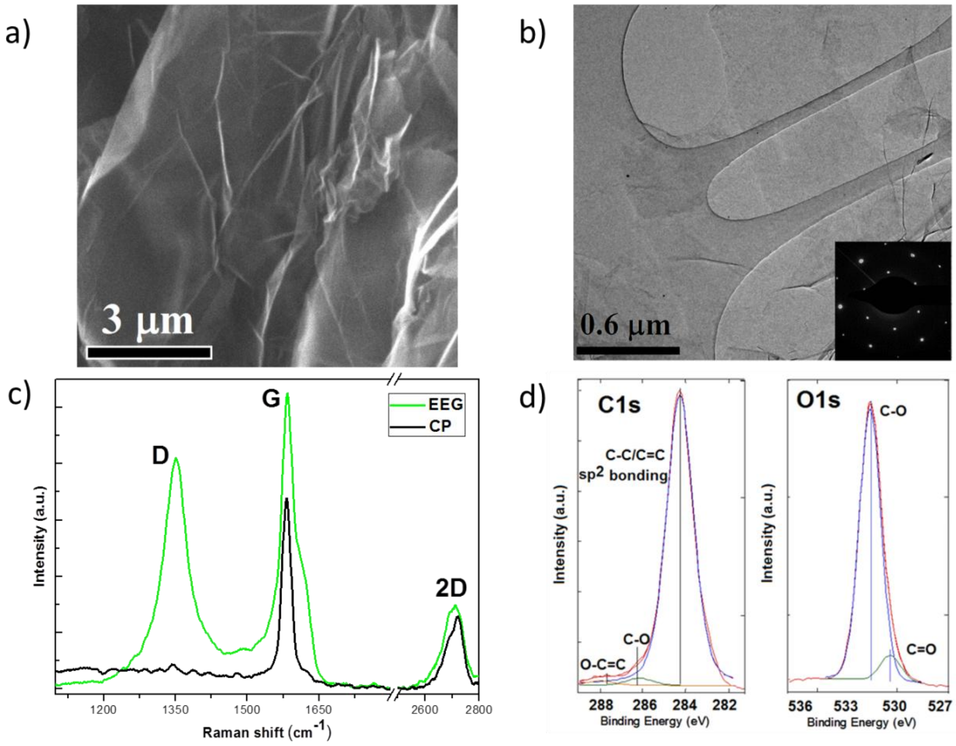


Fig. 1. a) SEM image of EEG sheets on a $SiO_2$ substrate, b) TEM image of EEG and SAED analysis, c) Carbon foil (CF) and EEG Raman spectra (Laser 532 nm) and d) XPS spectra of EEG C1s and O1s spin-orbital couplings.

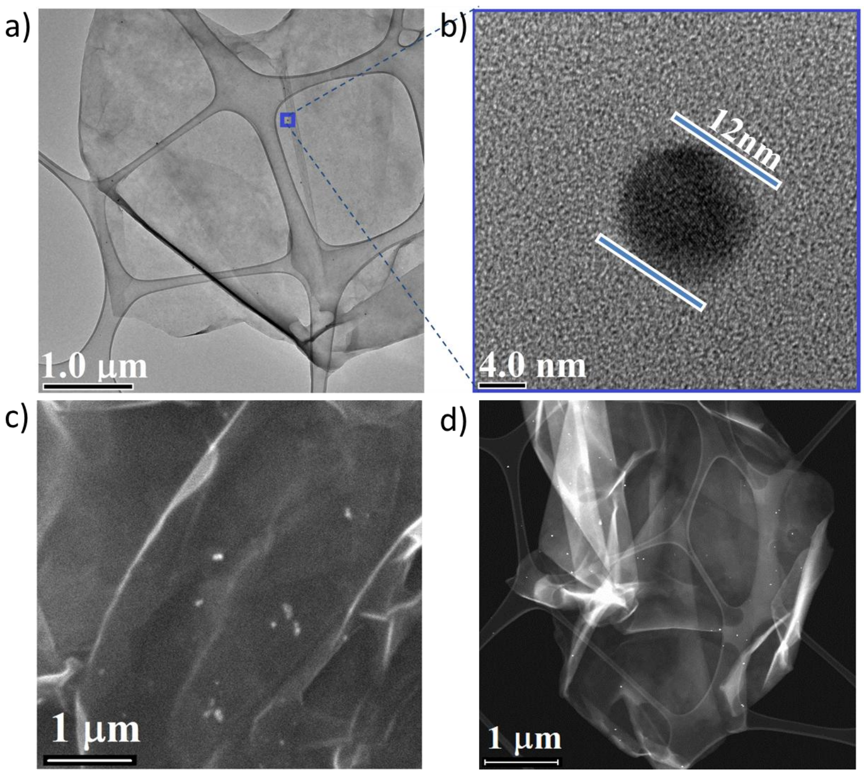


Fig. 2. a) TEM image of a EEG-Au-NP composite, b) Au-NP on the surface of EEG c) SEM image of a EEG-Au-NP composite. d) Scanning TEM image of a EEG-Au-NP composite