Graphene Transparent Electrodes for Flexible Electronics

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Graphene has rapidly emerged as an extremely promising system for future smart, flexible and transparent electronics. Thanks to its outstanding properties in term of mobility (~ 2.5×10^5 cm^2V^{-1} s^{-1}), optical absorption (~2,3%), Young modulus (~1TPa) and chemical stability, graphene could take on the challenges of this new technological field. Parameters as sheet resistance and transmission are correlated and both of them are strongly affected by the quality of the graphene coating and the requirements for the properties for each electrode type are strictly related to its application [1].

In order to achieve low sheet resistance, high transmittance and flexibility, two different approaches were performed: a layer by layer addition of CVD graphene monolayers on PET [2] and the doping of graphene with gold chloride ($AuCl_3$) [3]. Moreover we performed the doping process also on electrochemically exfoliated graphene oxide membranes transferred with a roll to roll method on PET [4].

The graphene electrodes obtained with these approaches show good electrical and optical parameters, high flexibility and chemical stability. These materials can be useful for future transparent bendable electronics like touch screens, smart windows, flexible LCD, etc [5].

References

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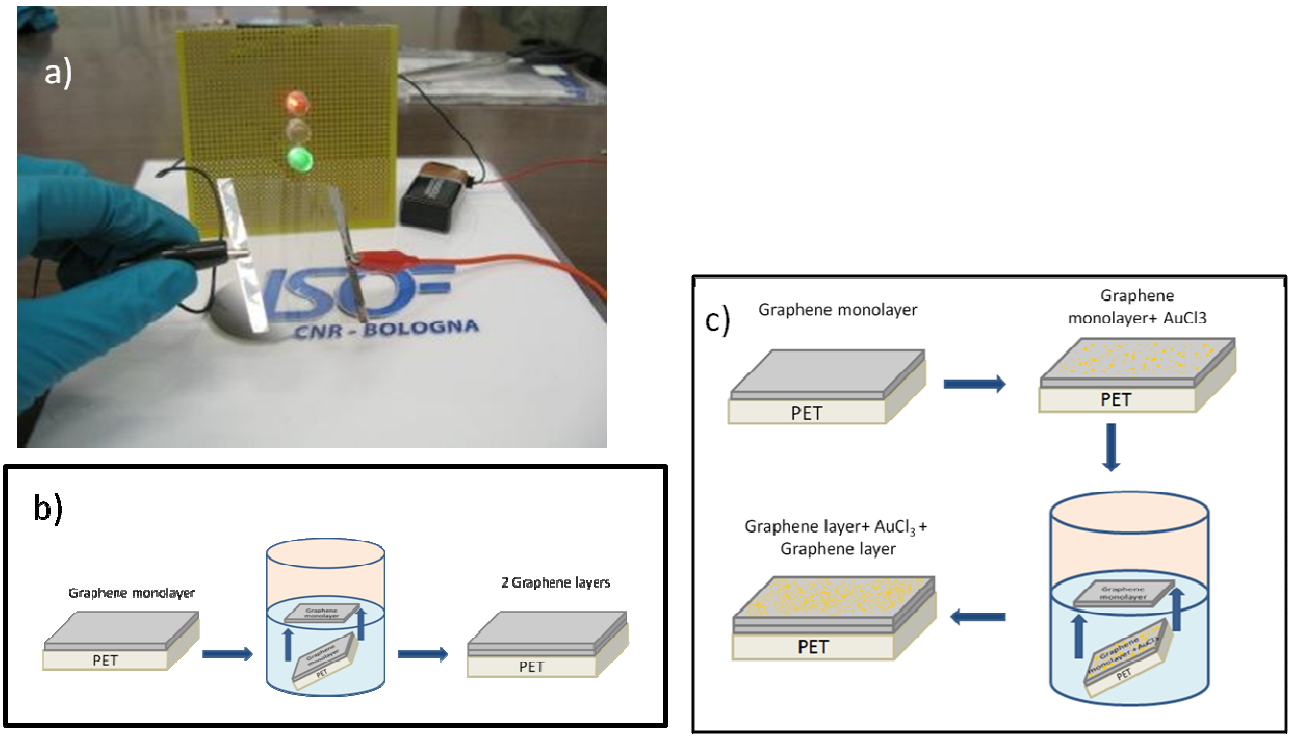

Figure 1: a) Transparent and flexible CVD graphene electrode on PET; schematic process for the production of b) a bilayer CVD graphene on PET trough the addition of two CVD graphene monolayers and c) a CVD graphene monolayer + doping + CVD graphene monolayer structure on PET.