# An Electrochemical Reaction Pathway for the Generation of Graphen-like Films and Self-Assembled Nanographenes.

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Low-dimensional carbon nanostructures, such as nanotubes and graphenes, represent a very promising class of new materials in the field of nanotechnology. As suggested by Müllen,[1] graphenes could be obtained following a bottom-up approach, by synthesizing large polycyclic aromatic hydrocarbons (nanographenes) from suitable precursors. Their subsequent intermolecular condensation into progressively more extended structures can produce macroscopic graphene films.

Corannulene is a bowl-shaped polycyclic aromatic hydrocarbon recalling the fullerene surface and it is particularly intriguing to develop new materials, for its unique redox and luminescent properties. It can undergo several reduction processes that we have reinvestigated over a large range of experimental conditions, thus observing, for the first time, the reversible electrochemical generation of up to the triply reduced corannulene.[2]

At odd, the oxidation has been scarsely investigated, so far, as it is a completely irreversible process that brings about a rapid fouling and passivation of the electrode surface.[3] The adoption of suitable ultra-dry solvents and electrolytes with very high oxidation resistance and low nucleophilicity allowed to study and exploit the reactivity of the electrogenerated corannulene carbocations.

In this communication the interesting redox, spectroelectrochemical, luminescence and electrochemiluminesce properties[4] of corannulene and derivative species, together with the structure of their electrochemically generated films, will be discussed.

Moreover, a new and appealing electrochemically-induced reaction to obtain self-assembled nanographene structures from an arene precursor will be shown.

*References:*

[1] Müllen, K.J. et al. *J. Am. Chem. Soc.* **2004**, 126, 3139.
[2] Bruno, C. et al. *J. Phys. Chem. B* **2009**, 113, 1954.
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