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**Large-area graphene synthesis over platinum surfaces by catalytic CVD:
towards biosensor microdevices**

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Abstract: Large-area graphene appears as a promising material in many applications such as catalysis, electronic microdevices or biochemical microsensors due to its exceptional properties. One of the main issues is the ability of providing continuous layers of high quality graphene on large-scale surfaces. In this frame, using platinum surfaces as a catalyst for chemical vapor deposition (CVD) processes appears interesting since it leads to continuous mono-bi-layers of graphene over millimetric size domains. The present study aims to determine the optimized experimental parameters for growing high quality, large-area graphene by catalytic CVD from methane on Pt surfaces under ambient pressure at 1040°C. Both massive Pt foil and thin Pt layers deposited on oxidized Si wafers have been studied. The influence of substrate annealing pre-treatment conditions, CH₄ flow rate and run duration will be discussed. The resulting large-area graphene has been investigated by scanning electron microscopy as well as Raman spectroscopy. Thus, it has been observed that the increasing duration of the thermal pre-treatment of the Pt surface yields larger Pt grains leading to a continuous layer of graphene. The following step of our study concerns the functionalization of the resulting graphene layers in order to afford an alternative carbon-based material to the usual glassy carbon electrode in biosensors application. Preliminary results concerning the functionalization of the graphene-electrode by diazonium salts for improving sensor lifetime will be presented. The resulting functionalized microelectrodes are investigated by cyclic voltammetry and differential pulse voltammetry. The final aim of this work is to synthesize continuous layers of graphene on patterned Pt surfaces using silicon technology for integration, which allows the delicate transfer step of graphene to be avoided.