Abstract Submitted
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Engineering epitaxial graphene with oxygen[1] AMINA KIMOUCHE, SYLVAIN MARTIN, CLEMENS WINKELMANN, OLIVIER FRUCHART, HERVÉ COURTOIS, JOHANN CORAUX, Institut NEEL, CNRS & UJF Grenoble, HYBRID SYSTEM AT LOW DIMENSION TEAM — Almost free-standing graphene can be obtained on metals by decoupling graphene from its substrate, for instance by intercalation of atoms beneath graphene, as it was shown with oxygen atoms [1]. We show that the interaction of oxygen with epitaxial graphene on iridium leads to the formation of an ultrathin crystalline oxide extending between graphene and the metallic substrate via the graphene wrinkles. Graphene studied in this work was prepared under ultra-high vacuum by CVD [2,3]. The samples were studied by combining scanning probe microscopy (STM, AFM) and spatially resolved spectroscopy (Raman, STS). The ultrathin oxide forms a decoupling barrier layer between graphene and Ir, yielding truly free-standing graphene whose hybridization and charge transfers with the substrate have been quenched [4]. Our work presents novel types of graphene-based nanostructures, and opens the route to the transfer-free preparation of graphene directly onto an insulating support contacted to the metallic substrate which could serve as a gate electrode. References [1] Sutter, P. *et al.* J. Am. Chem. Soc. 132, 8135 (2010). [2] Coraux, J. *et al.* Nano Lett. 8, 565 (2008). [3] Vo-Van, C ; Kimouche, A *et al.* Appl. Phys. Lett. 98, 181903 (2011). [4] Kimouche, A *et al.* Fully decoupling graphene from its substrate via wrinkles. *Submitted*

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