Graphene layers deposited on copper substrate by hot wire CVD

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Graphene layers were grown on copper by chemical vapour deposition (CVD) thermally activated in a hot wire process. The depositions were performed at 250 Pa using CH_4 or C_2H_2 as gas precursors, which were diluted in a hydrogen atmosphere. In order to facilitate the nucleation and growth of the graphene ultrathin layer, a copper film was previously deposited on a polished c-Si wafer by sputtering (PVD) of a pure copper target at 0.5 Pa of argon. To avoid the oxygen contamination, the PVD and CVD processes were performed consecutively in the reactor operating at base pressure of $2 \cdot 10^{-4}$ Pa. A graphite heater kept the substrate temperature at 800ºC and activated the decomposition of the precursor. The other variables considered in this work were the gas flow ratio and the distance between sample and heater. Raman spectroscopy assessed the synthesis of carbon in graphene form by showing the characteristic 2D band. Also, the morphology of the samples was characterized by atomic force microscopy (AFM) and scanning electron microscopy (SEM). These layers were deposited on large area substrates (≈ 5 cm^2). The results, which are discussed in terms of the technological parameters of deposition, suggest the feasibility of hot wire CVD to produce graphene layers on metallic substrates.