STUDY OF COPPER SUBSTRATE PRETREATMENT DURING CVD GROWTH OF GRAPHENE

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Abstract

"Pretreatment of copper substrates is an important step in graphene production by thermal CVD process. In our work we investigated behaviour of copper catalyst during controled heating and annealing under various conditions. We used two types of substrates, first group of substrates are twotypes of 25 micrometer thin copper foil - Alfa Aesar (item No. 13382) and MTI (EQ-bccf-25u). We used this foil in "as is" and cleaned by acetone and IPA. The second group of substrates is formed by a silicon wafer (10x15 mm) with 100 nm thermal silicon oxide overlayer with thermally evaporated copper in form of 8 mm diameter disc(thickness 300 nm and 500 nm). Experiments were carried in evacuated laboratory furnace. We modified annealing temperature (700, 800, 900 and 1000 C), substrate heating rate and an atmosphere in the furnace (vaccum, hydrogen and argon or their mixture). The copper substrates annealed under these conditions were analyzed by optical and scanning electron microscopy. The analysis result showed different copper recrystalisation, especially grain size above 800 C and disintegration of evaporated films, copper dewetting on SiO2, depending on the annealing atmosphere. Graphene growth is tested on selected substrates."

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