Title (en)

DIRECT GRAPHENE GROWTH ON MGO (111) BY PHYSICAL VAPOR DEPOSITION: INTERFACIAL CHEMISTRY AND BAND GAP FORMATION

Title (de)

DIREKTES GRAPHENWACHSTUM AUF MGO (111) DURCH PHYSIKALISCHE DAMPFABLAGERUNG: GRENZFLÄCHENCHEMIE UND BANDLÜCKENBILDUNG

Title (fr)

CROISSANCE DIRECTE DE GRAPHÈNE SUR DU MGO(111) PAR DÉPOSITION EN PHASE VAPEUR PAR PROCÉDÉ PHYSIQUE : CHIMIE INTERFACIALE ET FORMATION D'UNE LARGEUR DE BANDE INTERDITE

Publication

EP 2720809 A4 20150114 (EN)

Application

EP 12800366 A 20120613

Priority

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Abstract (en)

[origin: WO2012174040A1] Graphene can be grown directly on MgO(111) by industrially practical and scalable methods: free radical-assisted chemical vapor deposition (CVD), and physical vapor deposition (PVD). Single layer and double layer films can be produced by PVD, with a ~ 2 monolayer thick film as the apparent limiting thickness. C(1s) x-ray photoemission spectra (XPS) indicate that in both layers, carbon atoms are in two different oxidation states. A band gap of - 0.5 -1 eV has been observed for the two layer film. The XPS, LEED and band gap findings indicate that the graphene/MgO interface is commensurate, and that the MgO surface layer is reconstructed, resulting in carbon->MgO charge transfer. The ability to grow MgO(111) films on Si(100) or Si(111)- reported in the literature- points to a direct path to the development of graphene-based field effect transistors (FETs) and spin-FETs on MgO(111)/Si(100).

IPC 8 full level

C01B 31/04 (2006.01)

CPC (source: EP KR)

B82Y 30/00 (2013.01 - EP); **B82Y 40/00** (2013.01 - EP); **C01B 32/05** (2017.07 - KR); **C01B 32/184** (2017.07 - EP); **C30B 29/36** (2013.01 - KR); **H01L 29/1606** (2013.01 - EP); C01B 2204/04 (2013.01 - EP); C01B 2204/22 (2013.01 - EP)

Citation (search report)

- [X] US 2010247801 A1 20100930 - ZENASNI AZIZ [FR]
- [XDI] SNEHA GADDAM ET AL: "FAST TRACK COMMUNICATION; Direct graphene growth on MgO: origin of the band gap", JOURNAL OF PHYSICS: CONDENSED MATTER, INSTITUTE OF PHYSICS PUBLISHING, BRISTOL, GB, vol. 23, no. 7, 23 February 2011 (2011-02-23), pages 72204, XP020186555, ISSN: 0953-8984, DOI: 10.1088/0953-8984/23/7/072204
- [XDI] KONG L ET AL: "Graphene/substrate charge transfer characterized by inverse photoelectron spectroscopy", JOURNAL OF PHYSICAL CHEMISTRY C 20101216 AMERICAN CHEMICAL SOCIETY USA,, vol. 114, no. 49, 16 December 2010 (2010-12-16), pages 21618 - 21624, XP002733292, DOI: 10.1021/JP108616H
- See references of WO 2012174040A1

Designated contracting state (EPC)

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