SURFACE POTENTIAL DYNAMIC ON HIGHLY ORIENTED PYROLYTIC GRAPHITE

D. Martínez-Martín and J. Gómez-Herrero
Dpto. Física de la Materia Condensada,
Facultad de Ciencias. Universidad Autónoma de Madrid
Madrid 28049, Spain

Carbon allotropes: diamond, graphite, nanotubes and fullerens, exhibit highly interesting fundamental properties[1] and a variety of applications in material science. Specifically, graphite is an interlayer compound with good electrical conductance in-plane but a weak bounding between layers resulting in a low electrical conductivity along the surface perpendicular direction[2]. If this perpendicular conductivity is low enough, it may result in high electrical resistance between adjacent domains, giving rise to surface potential fluctuations (SPF) as reported by Yonghua Lu et al[3]. However a recent comment to this work[4] attributes the SPF to surface contamination. In this letter we provide a procedure to create SPF in any type of highly oriented (HOPG) graphite sample. By using an atomic force microscope (AFM) inserted on a high vacuum chamber we measure potential maps that show an SPF dynamic that depends on the system pressure. Our results suggest that SPF dynamic is strongly influenced by the mechanical stress introduced by the sample cleaving and do not support contamination as the main cause for the observed SPF.

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[3] Lu, Y. H. *et al*. Electrostatic force microscopy on oriented graphite surfaces. Coexistence of insulating and conducting behaviors. *Phys. Rev. Lett.* **97**, 076805 (2006).

[4] S. Sadewasser and Th. Glatzel. Comment on 'Electrostatic Force Microscopy onoriented Graphite Surfaces: Coexistence of Insulating and Conducting Behaviors. *Phys. Rev. Lett.* **98**, 269701 (2007)