Ordered Vacancy Network Induced by the Growth of Epitaxial Graphene on Pt(111)


1Instituto Ciencia de Materiales de Madrid (CSIC), C. Sor Juana Ines de la Cruz 3, 28049-Madrid, Spain
2Centro de Astrobiologia, INTA-CSIC, Torrejon de Ardoz, 28850 Madrid, Spain
3Sincrotrone Trieste SCpA, Strada Statale 14, Km. 163.5, 34149 Trieste, Italy
4Department of Chemistry, University of Cambridge, Cambridge CB2 1EW, United Kingdom
5Department of Applied Physics, Eindhoven University of Technology, P.O. box 513, 5600 MB Eindhoven, The Netherlands

jmendez@icmm.csic.es

We have studied large areas of √3×√3R30° graphene commensurate with a Pt(111) substrate. A combination of experimental techniques with ab initio density functional theory indicates that this structure is related to a reconstruction at the Pt surface, consisting of an ordered vacancy network formed in the outermost Pt layer and a graphene layer covalently bound to the Pt substrate. The formation of this reconstruction is enhanced if low temperatures and polycyclic aromatic hydrocarbons are used as molecular precursors for epitaxial growth of the graphene layers.

References


Figures

Figure caption. STM image (left) and DFT simulation (right) of the proposed vacancy model (overlaid).