

# Direct growth of graphene films on Si(111)

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## Abstract:

The preparation of graphene, a 2D sheet of carbon atoms arranged in a honey-comb structure on a suitable substrate, has attracted enormous attention in the scientific community during the last ten years [1-2]. Si(111) 7×7 might be one of the most attractive candidates because of its integration in the silicon technology [3]. The observation of honey-comb lattice of free-standing graphene after growing graphitic carbon films on Si(111) substrate through the deposition of a buffer layer with various thicknesses of amorphous carbon at room temperature has been demonstrated [4] (Figure 1). This indicates a high potential for graphene formation on silicon wafers. However, the surface roughness as well as the small size of the crystallites is still not suitable for further applications. In this poster, we present a significant improvement in the direct growth of graphene on Si(111) 7×7 surface under appropriate conditions through the deposition of carbon atoms using electron beam evaporation of a graphite rod. Our experimental results confirm that the effect of substrate temperature plays a very important role to the quality of graphene films. The structural properties of the samples are investigated by Auger Electron Spectroscopy (AES), X-ray Photoemission Spectroscopy (XPS), Reflection High Energy Electron Diffraction (RHEED), Raman Spectroscopy (RS) and Scanning Tunneling Microscopy (STM).

## References:

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## Figures:

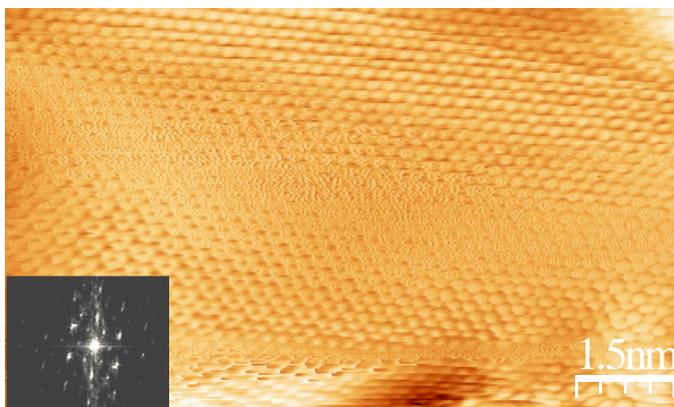


Figure 1: Atomic resolution STM images of graphene on Si(111) of 10×10nm<sup>2</sup> ( $V_{\text{Sample}} = -0.2\text{V}$ ,  $I_{\text{T}} = 10\text{nA}$ ) with an inset is a corresponding FFT image that exhibits diffraction pattern of hexagonal film structure.