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Atmospheric pressure growth of graphene on SiC(0001)

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Graphene, a single monolayer of sp^2 -bonded carbon, is a very unique 2-dimensional electron gas system with electronic properties fundamentally different to other 2DEG systems [1]. Several production routes exist for graphene. Among them, the solid-state decomposition of hexagonal silicon carbide (SiC) surfaces [2] is particularly attractive for the development of graphene based electronics [3,4]. The first part of the presentation gives a brief summary of recent studies on the structural and electronic properties of graphene and few-layer graphene grown on SiC(0001) under ultra-high vacuum (UHV) conditions. The second part of the talk is devoted to recent progress in the growth of large domain graphene films on SiC(0001) in Ar atmosphere. It is shown that growth in Ar ambient leads to a significant improvement of the surface morphology and domain size as well as carrier mobility.

- [1] A.H. Castro Neto, et al., Reviews of Modern Physics, in print (arXiv:0709.1163v2); and references therein.
- [2] A. Charrier, et al., J. Appl. Phys. 92 (2002) 2479.
- [3] C. Berger et al., J. Phys. Chem. B 108 (2004) 19912; C. Berger, et al., Science 312 (2006) 1191.
- [4] A.K. Geim and K.S. Novoselov, Nature Mat. 6 (2007) 183.