Growth and characterization of graphene layers on cubic-SiC(001)/Si standard wafers

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Graphene synthesis on the surface of alpha-SiC at high pressure of argon [1, 2] is the best method for graphene preparation so far. Nevertheless it does not meet the requirements of industrial mass-production because of the limited size and the costly nature of alpha-SiC wafers sliced from the single crystal ingots. If graphene layers can be fabricated on the surface of thin SiC film grown on a large-diameter standard Si wafer (SiC virtual substrate), its industrial impact would be enormous. Such graphene/cubic-SiC(001)/Si wafer could be easily adapted for graphene-based electronic technologies and thus could be directly patterned by standard Si-electronic lithographic processes. The realizability of graphene synthesis on the surface of cubic-SiC(001) thin film (about 1 μm) deposited on standard Si wafer was already demonstrated in Refs. [3-5]. Here we show our recent data of investigation of graphene grown on SiC(001) virtual substrate. It seems that the results represent a realistic way of bridging the gap between the outstanding graphene properties and their technological applications.

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