Graphene on SiC: growth, characterization and possible device application

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The graphene films used in the study were grown on the Si face of semi-insulating silicon carbide substrates via thermal decomposition of SiC at a temperature of about 1700ºC in a vacuum and in the atmosphere of an inert gas (Ar). Before graphene was grown, a sublimation etching of SiC was performed to remove the defective layer from the surface. Raman spectroscopy, atomic-force microscopy, low-energy electron diffraction (LEED), and angle-resolved photoemission spectroscopy (ARPES) were used to obtain and analyze information about the crystal and electronic structure of the graphene layers (Figs. 1 and 2). It is shown that the optimization of the growth parameters, performed on the results of the integrated study, made it possible to develop a reliable growth technology of high-quality graphene layers with thicknesses of one to two monolayers.

Ultrasensitive gas and biosensors were fabricated on the basis of the films and tested [1, 2].
