Nanotechnology Based Wrinkled Graphene for Flexible Electronics

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Graphene is a novel and very promising semiconductor material. It is a mono atomic layer of graphite with a two-dimensional honeycomb arrangement of carbon atoms. Graphene has unusually very high electrical conductivity and mobility enabling the possibility of building fast and ultra high density electronics devices such as diodes, transistors and other integrated circuits. Subsequently, superfast computers and various other electronics devices can be developed in a flexible configuration with small amounts of power to support them. This could revolutionize the electronics industry. In addition, Graphene is flexible, strong, and transparent. As such, it can be used in composite structures with extremely light weight. In this project, wrinkled Graphene films were grown on a nanoengineered hexagonal-Silicon Carbide (2H-SiC) substrate by annealing up to 1200 C for the first time using a Chemical Vapor Deposition (CVD) furnace in vacuum. Three trials were conducted and material was characterized for the morphology and elemental analysis. An examination of microstructures material's quality looks very encouraging. The average value of electronic mobility published is around ~6681 cm2/V.s. In conclusion, my hypothesis of the possibility of growing quality Wrinkled Graphene using 2H-SiC substrate has potential for high electronic mobility value, and microstructure observed within the material was proved to be correct.