

Electron transport and thermoelectric power in CVD grown centimeter size graphene

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In the past few years graphene has emerged as one of the most promising materials for future electronics. Graphene prepared even with extremely crude techniques has shown a wide range of remarkable properties that suggest it could become the natural successor to silicon. One of the most important current limitations to graphene technology is an inability to produce large size graphene samples in clean and reproducible ways. Recently developed CVD graphene preparation techniques are currently considered among the most practically applicable. We study here CVD grown 4 layer graphene samples up to 1 cm by 1 cm in size. Room temperature electrical resistivity of $\sim 4 \cdot 10^{-5}$ Ohm*cm and weakly semiconducting type of the temperature dependence from room temperature down to 77 K have been observed. We have also made thermopower measurements to obtain additional information on electronic band structure. Room temperature hole transport Seebeck coefficient of ~ 12 μ V/K has been obtained. A typical for metallic system temperature dependence of the measured thermopower has been observed. Interpretations of the obtained experimental results and device applications including Field Effect Transistors will also be discussed.

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