Engineering the electrical properties of graphene materials

Submitted by Ivan Khrapach to the University of Exeter as a thesis for the degree of Doctor of Philosophy in Physics
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I certify that all material in this thesis which is not my own work has been identified and that no material has previously been submitted and approved for the award of a degree by this or any other University.

Ivan Khrapach
December, 2012
Abstract

In this thesis the properties of graphene and its few-layers are engineered to make them highly conductive. Two different approaches were implemented to achieve this goal. One approach was to increase the concentration of charge carriers by intercalation of acceptor FeCl$_3$ molecules between graphene planes. This resulted in a highly conductive yet transparent material which can be useful for applications. Another approach was to increase the mobility of carriers by means of removing surface contamination in the current annealing process. Optimal annealing parameters were found and a reproducible cleaning method was suggested.
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