

The Effect of Charged-Impurity on the Electrical Conductivity in Two-Dimensional Graphite

Ghassem Ansaripour*, Mohammad Bahrami Moghaddas

Department of Physics, Faculty of Science, Bu-Ali Sina University of Hamedan, Hamedan, Iran

Received: 08.05.2017 Final revised: 20.01.2019 Accepted: 26.06.2019

Abstract

In this article, regarding the charged impurities as scattering centers, we have investigated their effects on the conductivity in the two-dimensional graphite. First, by considering the importance of the influence of screening on the impurities and static polarization, the use of effective mass approximation, and the KP equation, the conductivity versus the sheet carrier concentration for different temperatures is calculated and plotted. We have shown that the conductivity at low temperatures behaves like metal, while at high temperatures shows an insulating behavior. Also, the charged carrier transport and the effect of different charged impurity distributions for the two impurity distribution cases of uniform random and cluster are calculated and studied. The obtained results are in agreement with the recent experimental and theoretical data.

Keywords: graphene, screening effect, polarization, clustered impurity, uniform random distribution

* Corresponding Author: gansaripour@basu.ac.ir

