MODIFICATION OF THE RESISTANCE OF A GRAPHENE LAYER BY A 1-10 KEV ELECTRON BEAM

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Multiple applications of graphene have been proposed owing to its unique physical, chemical, and electrical properties [1]. It should be noted that those characteristics can be modified in-situ by irradiation [2]. For example, the resistance of graphene films is reduced when irradiated by 25 keV electrons [3].

In this work, the modifications of the resistance of a graphene layer caused by irradiation with 1-10 keV electrons for 5-30 minutes are studied. Graphene was obtained by electrochemical methods and deposited by spray coating in 10 mm square glass substrates. The resistance of the film was measured by the Van der Pauw’s method, and the properties of the graphene films were also studied using Raman and XPS spectroscopy.

REFERENCES

[1] W. Choi, I. Lahiri, R. Seelaboyina, and Y. S. Kang, “Synthesis of Graphene and Its Applications: A Review,” Critical Reviews in Solid State and Materials Sciences, vol. 35, no. 1, pp. 52–71, Feb. 2010, doi: 10.1080/10408430903505036.

[2] J. D. Jones, K. K. Mahajan, W. H. Williams, P. A. Ecton, Y. Mo, and J. M. Perez, “Formation of graphane and partially hydrogenated graphene by electron irradiation of adsorbates on graphene,” Carbon, vol. 48, no. 8, pp. 2335–2340, Jul. 2010, doi: 10.1016/J.CARBON.2010.03.010.

[3] P. Gulia, R. Brajpuriya, S. Kumar, and A. Tripathi, “Synthesis of graphene oxide thin film and effect of electron beam irradiation,” AIP Conference Proceedings, vol. 1832, no. 1, p. 140023, May 2017, doi: 10.1063/1.4980805.