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Relationship between Transport Properties and Raman Spectra in Electron Beam Irradiated Graphene HIKARI TOMORI, RINEKA HIRAIIDE, HIROKAZU TANAKA, YOUTI OOTUKA, AKINOBU KANDA, Division of Physics and TIMS, Faculty of Pure and Applied Sciences, University of Tsukuba — Raman spectroscopy is commonly used to characterize disorder in graphene. Increase of structural defects leads to raise in intensity of the Raman D band for low defect densities. Defects also cause degradation of graphene transport properties. Thus, a certain relationship is expected between the Raman spectra and transport properties in graphene. Here, we investigate Raman spectra and transport properties of graphene as a function of the amount of electron beam irradiation. The electron beam irradiation leads to generation of the Raman D band and decrease of carrier mobility. We find that the intensity ratio of Raman D to G peaks is inversely proportional to square of the carrier mean free path. The proportionality coefficient is proportional to the carrier density. This kind of relationship has not been reported so far. Our result may pave the way for evaluating graphene transport properties with Raman spectroscopy.

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