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Comparison of mobility at the top and bottom surfaces of multilayer graphene placed on SiO₂ substrate AKINOBU KANDA, YOUSUKE NUKUI, HIKARI TOMORI, HIDENORI GOTO, YOUTI OOTUKA, University of Tsukuba — It is known that charged impurities attached to the surface of graphene films are the main source of deteriorating mobility in graphene flakes obtained by the mechanical exfoliation. There are several origins for charged impurities: charges in the substrate, to which the bottom surface of the graphene films faces, the adsorbed molecules and contaminations due to chemicals (resist residues and so on) mainly attached to the top surface of graphene. This paper aims to evaluate the influence of the charged impurities on the top and bottom surfaces separately. For this purpose, we used dual-gated multilayer graphene with a contactless top gate. We developed a method of estimating the mobility of the top and bottom surfaces of multilayer graphene (MLG), from the top- and bottom-gate voltage dependence of the conductivity. We find that in thick MLG, mobility of the top surface is more than three times larger than that of the bottom surface. This indicates that the influence of the SiO₂ substrate on the mobility is stronger than that of adsorbates and contaminations on the top surface of the MLG.

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