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Temperature dependence of conductance in bilayer graphene with electric-field-induced band gap[1] HISAO MIYAZAKI, NIMS, JST-CREST, LI SONGLIN, NIMS, TAKEO MINARI, NIMS, JST-CREST, AKINOBU KANDA, Univ. of Tsukuba, JST-CREST, KAZUHITO TSUKAGOSHI, NIMS, AIST, JST-CREST — We experimentally investigated the transport properties of bilayer graphene gated by top and back gate. The conductance around the charge neutral point was strongly suppressed in the high electric field applied between the two gate electrodes, implying an existence of the band gap. To support the existence of the band gap, we examined temperature dependence of the conductance at the charge neutrality. Two thermal activation type conductions were needed to explain the observed temperature result. Low- temperature part ($T <\sim$100 K) of the temperature dependence was reasonably explained by the variable range hopping conduction. At higher temperatures ($T >\sim$100 K), an additional conductance component was necessary to explain the temperature dependence. The additional component has thermal activation energy >0.1 eV. This suggests the existence of the intrinsic band gap in the order of hundreds of meV, which agrees well with theoretical predictions and experimental results with optical method.

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