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Imaging of Electron Beam Induced Current in Epitaxial graphene[1] SHIN MOU, JOHN BOECKL, WEIJIE LU, J.H. PARK, W.C. MITCHEL, Air Force Research Laboratory, STEPHEN TETLAK, Wyle Laboratories — It has been observed that there forms a Schottky junction between graphene and SiC in epitaxial graphene due to the work function difference. As a result, it is viable to apply the electron beam induced current (EBIC) technique on epitaxial graphene due to the fact that it needs a built-in field and ample electron generation volume to generate EBIC. EBIC is an important characterization technique, which identifies electrically active impurities/defects, detects local built-in field, and measures minority carrier diffusion length. In this paper, we use a FEI SEM equipped with a current amplifier to investigate the spatial mapping of EBIC. The incident electron beam generates excited electron-hole pairs in SiC and the minority carriers are collected through the Schottky junction before flowing into graphene. EBIC imaging reveals mesoscopic domains of bright and dark contrast areas due to local EBIC polarity and magnitude, which is believed to be the result of spatial fluctuation in the carrier density in graphene. We also investigate the electron energy dependence, which modulates the EBIC magnitude. With an analytical drift-diffusion current model, we are able to extract the minority carrier diffusion length in the SiC, which is on the order of micro meter.

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