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Edge-Localized Spin-Polarized State in Nanofacet Formed on SiC(0001) Surfaces KEISUKE SAWADA, JUN-ICHI IWATA, ATSUSHI OSHIYAMA, Department of Applied Physics, The University of Tokyo — The nanometer-scale facet (nanofacet) are self-organized on the SiC(0001) surfaces being slightly misoriented toward the $(11\bar{2}0)$ direction[1, 2]. It is known that the nanostructure induces the novel electronic property such as localized states at zigzag graphene edges[3]. In this study, we perform density-functional calculations on the nanofacet formed on the SiC(0001) surface. We find peculiar electron states without dispersion along the step edges (SEs) near the Fermi level. To explore possibilities of the observation of these peculiar states, we examine the situation that the nanofacet is covered by H atoms and calculate the H absorption energy at the several positions on the nanofacet. We then find that absorbed H atoms energetically prefer terraces to SEs. This leads to a situation in which H atoms at SE C atoms are desorbed. In this case, we find an electronic state distributed along the SE and is spin-polarized. Implication of magnetic transport in such nanofacet will be discussed. [1] H. Nakagawa *et al.*, PRL **91**, 226107 (2003). [2] M. Fujii and S. Tanaka, PRL **99**, 016102 (2007). [3] M. Fujita *et al.*, JPSJ **65**, 1920 (1996).

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