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Electronic structures in SiC/SiO2 interface from first-principles calculation -Roles of peculiar electron states floating in internal space- YU-ICHIRO MATSUSHITA, The University of Tokyo, MAURO BOERO, The University of Strasbourg, ATSUSHI OSHIYAMA, The University of Tokyo — Silicon carbide (SiC) is a promising material for power electronic devices. We have reported that the wavefunction at the conduction-band minimum (CBM) of SiC "floats in internal space with continuum-state character [1]. By considering the floating nature of the CBM, drastic energy-level changes of CBM observed in SiC polytypes can be explained naturally [2]. Moreover, we have clarified that floating nature of CBM varies the effective masses in SiC. In this study, we have investigated how the electronic structure of CBM is modified in SiC/SiO2 interfaces, where the internal space is severely deformed, and how the floating electron state affects the material properties. We have found that we can realize 1 dimensional electron channels in the interface, and that the effective masses of CBM strongly depend on the interface structures. [1] Y. i. Matsushita, S. Furuya, and A. Oshiyama, PRL, 108, 246404 (2012). [2] Y. i, Matsushita, and A. Oshiyama, PRL 112 136403 (2014).

Yu-ichiro Matsushita
The University of Tokyo

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