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Magnetic Properties of Rhombohedral Graphene Thin Films¹ THANH CUONG NGUYEN, MINORU OTANI, NRI-AIST, Tsukuba, Japan, SUSUMU OKADA, University of Tsukuba, Tsukuba, Japan — Ever since the fabrication of single and few layers graphene, the graphene thin films have been attracting so much attention in the field not only of low-dimensional sciences but also of nano-scale technologies due to their perfect two-dimensional network. One of fascinating issues in this carbon allotrope is the intrinsic magnetism that is inherent in their topological properties. We have demonstrated that the (0001) surfaces of graphene thin film with rhombohedral-stacked arrangement exhibit ferrimagnetic spin ordering induced by flat dispersion band associated with the peculiar surface localized electron states classified as the “edge state” [1]. In this work, we systematically investigate how the electronic and magnetic properties of the rhombohedral-stacked graphene thin films depend on the number of graphene layers, BN substrate, and uniaxial pressure using first-principles total-energy calculations in the framework of density functional theory [2].

[1] M. Otani, M. Koshino, Y. Takagi, and S. Okada, Phys. Rev. B 81 (2010) 161403(R).

[2] N. T. Cuong, M. Otani, and S. Okada, Surf. Sci. (2011), doi:10.1016/j.susc.2011.10.001

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