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Manipulation of Dirac cones in metal-intercalated epitaxial graphene[1] CAI-ZHUANG WANG, MINSUNG KIM, MICHAEL TRINGIDES, KAI-MING HO, Ames Laboratory and Iowa State University, Ames, IA 50011 — Graphene is one of the most attractive materials from both fundamental and practical points of view due to its characteristic Dirac cones. The electronic property of graphene can be modified through the interaction with substrate or another graphene layer as illustrated in few-layer epitaxial graphene. Recently, metal intercalation became an effective method to manipulate the electronic structure of graphene by modifying the coupling between the constituent layers. In this work, we show that the Dirac cones of epitaxial graphene can be manipulated by intercalating rare-earth metals. We demonstrate that rare-earth metal intercalated epitaxial graphene has tunable band structures and the energy levels of Dirac cones as well as the linear or quadratic band dispersion can be controlled depending on the location of the intercalation layer and density. Our results could be important for applications and characterizations of the intercalated epitaxial graphene.

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