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Electronic structure, electron-phonon coupling and superconductivity in metal-doped few-layer graphene SERDAR OGUT, University of Illinois at Chicago, XUHUI LUO, University of Illinois at Chicago & National Institute of Standard and Technology, TANER YILDIRIM, National Institute of Standard and Technology & University of Pennsylvania — We systematically investigate from first-principles how the electronic properties and electron-phonon (el-ph) coupling change in metal (Ca, Li) doped graphene as we tune the number of graphene layers from single layer to three layers and to the case of bulk graphite. We find that the Fermi level and el-ph constant can be tuned by the number of layers. In particular, the number of graphene layers has a large effect on the inter-layer metal free-electron-like states, which give rise to large el-ph constant in these systems. Surprisingly, the el-ph coupling in Ca intercalated tri-layer graphene system is stronger than one in the superconducting Ca-doped graphite. Our results suggest the possibility of high T_c superconductivity in metal doped few-layer graphene for nanodevice applications.

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