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Correlation between adatom adsorption properties and growth morphology of metal on graphene[1] XIAOJIE LIU, Ames Laborotory, Iowa State University and Jilin University, China, C.Z. WANG, M. HUPALO, Ames Laborotory, Iowa State University, WENCAI LU, Jilin University, China, Y.X. YAO, P.A. THIEL, K.M. HO, M.C. TRINGIDES, Ames Laborotory, Iowa State University, AMES LABORATORY, IOWA STATE UNIVERSITY TEAM, JILIN UNIVERSITY, CHINA COLLABORATION — We present a systematic study of various metal adatom adsorption on graphene by *ab initio* calculations. The correlation between the adatom adsorption properties and the growth morphology of the metals on graphene is investigated. We show that the growth morphology is related to the ratio of the adsorption energy to the bulk cohesive energy (E_a/E_c) of the metals and the diffusion barrier (ΔE) of the metal adatom on graphene. The growth morphology is also affected by the strain induced by metal adsorption on graphene. We also show that most of the metal nanostructures on graphene are thermally stable again coarsening. The first-principles calculations are consistent well with the observations from recent experiments.

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