

Abstract Submitted
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Single-Layer graphene growth on crystalline Ni(111) and Ni(110) and the fate of Carbon on crystalline Ni(100).¹ PAULO ARAUJO, The University of Alabama, DANIELA MAFRA, ALFONSO REINA, Massachusetts Institute of Technology, YOUNG CHEOL SHIN, Stanford University, KI KANG KIM, Dongguk University-Seoul, MILDRED DRESSELHAUS, JING KONG, Massachusetts Institute of Technology — The growth of large area single-layer graphene (1-LG) is studied using ambient pressure CVD on single crystal Ni(111), Ni(110) and Ni(100). By varying both the furnace temperature in the range of 700 - 1100°C and the gas flow through the growth chamber, a uniform growth of high-quality 1-LG is obtained for Ni(111) and Ni(110), but only multilayer graphene (M-LG) growth could be obtained for Ni(100). The experimental results are interpreted to obtain the optimum combination of temperature and gas flow, and the results reported in this manuscript are interpreted through different thermodynamic mechanisms, such as diffusion, segregation and adsorption, which dictate the formation of different carbon structures over the different crystallographic directions of Ni. Characterization with optical microscopy, Raman spectroscopy and optical transmission accordingly support the experimental findings.

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