Position and number of layer (n = 0, 1, and more than 2) controlled graphene growth using Ni and MgO patterned ultra-flat Cu foil

Aram Lee[1,#], Kyoung Soon Choi[2,#],Jinheon Park[1], Tae Soo Kim[1], Jouhahn Lee[2], Jae-Young Choi[3,*], and Hak Ki Yu[1,*]

[1]Department of Materials Science and Engineering and Department of Energy Systems Research, Ajou University, Suwon 16499, Korea

[2]The Advanced Nano Surface Research group, Korea Basic Science Institute, Daejeon 34133, Korea

[3]School of Advanced Materials Science & Engineering, Sungkyunkwan University, Suwon, 16419, Korea

#These authors contributed equally to this work.

CORRESPONDING AUTHOR FOOTNOTE

Tel: +82(0)31-219-1680, FAX: +82(0)31-219-1613,

E-mail: hakkiyu@ajou.ac.kr, jy.choi@skky.edu

Supplementary Information S1. (a) CVD process for graphene growth on Ni-patterned peeled-off Cu foil: step 1 (S1) is the heating stage with H_2 ambient; step 2 (S2) is the methane insertion stage; and step 3 (S3) is the cooling stage. (b) OM images of patterned n-graphene, which was grown at 950 °C, transferred to SiO_2 (200 nm)/Si (100) substrate. (c) Scanning electron microscope image of graphene grown on Ni-patterned peeled-off Cu surface at 900 °C. Due to low solubility of carbon, all graphene grains are disconnected with each other, resulting in island growth.