**Supplementary Materials**

# *In situ* monitoring of growth of vertically stacked h-BN/graphene heterostructures on Ni substrates and their interface interaction

**Wei Wei[1,2], Guanhua Zhang[3], Jiaqi Pan[1], Yi Cui[1,*], Qiang Fu[2,*]**

[1] Vacuum Interconnected Nanotech Workstation, Suzhou Institute of Nano–Tech and Nano-Bionics, the Chinese Academy of Sciences, Suzhou 215123, China; wwei2018@sinano.ac.cn (W. W.); jqpan2018@sinano.ac.cn (J. P.); ycui2015@sinano.ac.cn(Y. C.)

[2] State Key Laboratory of Catalysis, iChEM, Dalian Institute of Chemical Physics, the Chinese Academy of Sciences, Dalian 116023, China; qfu@dicp.ac.cn (Q. F.)

[3] State Key Laboratory of Molecular Reaction Dynamics, Dalian Institute of Chemical Physics, the Chinese Academy of Sciences, Dalian 116023, China; zhanggh@dicp.ac.cn (G. Z.)

* Correspondence: ycui2015@sinano.ac.cn; qfu@dicp.ac.cn

## More initial XPEEM results of vertical stacked h-BN/graphene heterostructures growth on Ni substrates

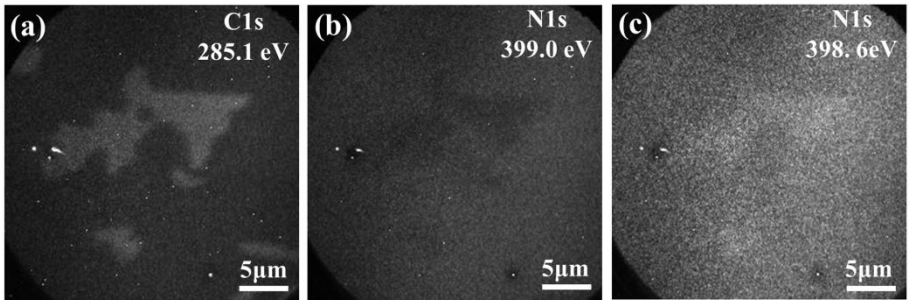


**Figure S1** Initial XPEEM images at C 1s and N 1s core levels with binding energies of 285.1, 399.0, and 398.6 eV ($h\nu$ = 500 eV) at the surface segregation temperature of 650 °C. The distribution of

related elements with the certain chemical state displays bright contrast.

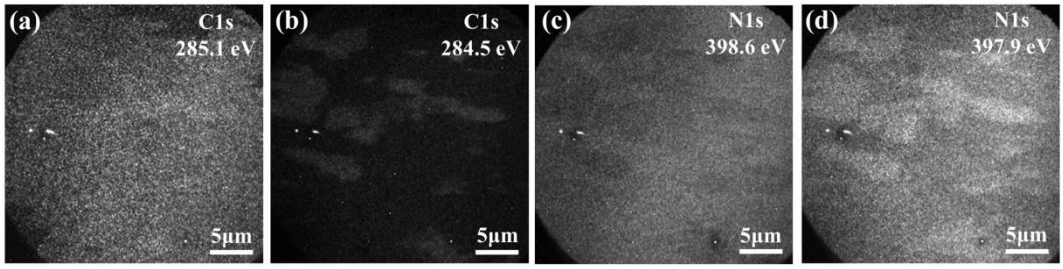


**Figure S2** Initial XPEEM images at C 1s core levels with binding energies of 285.1 and 284.5 eV, and N 1s core levels with binding energies of 398.6 and 397.9 eV at the surface segregation temperature of 600 ºC. The distribution of related elements with the certain chemical state displays bright contrast.