

SUPPORTING INFORMATION

A study of the growth-time effect on graphene layer number based on Cu–Ni bilayer catalyst system

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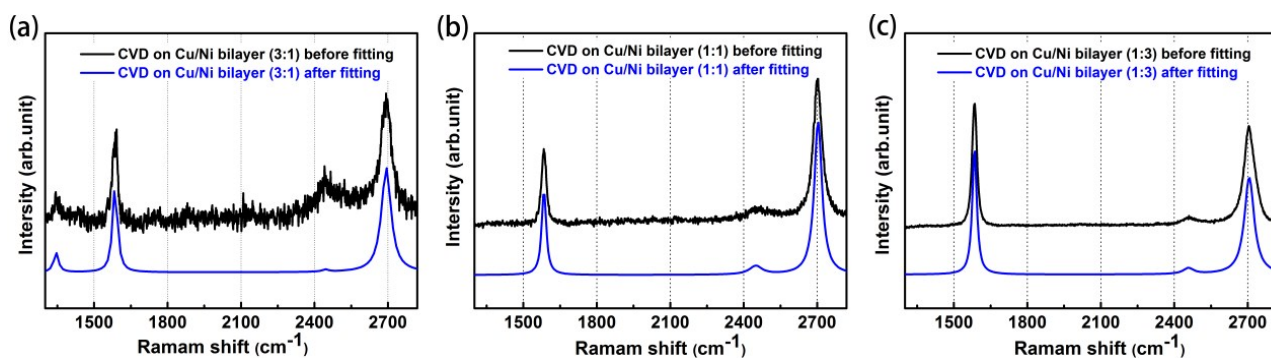


Figure S1. (a)–(c) Typical Raman spectra of graphene films grown on bilayer catalysts with various Cu/Ni ratios. The results show the comparison of the original and Gaussian fitted spectra.

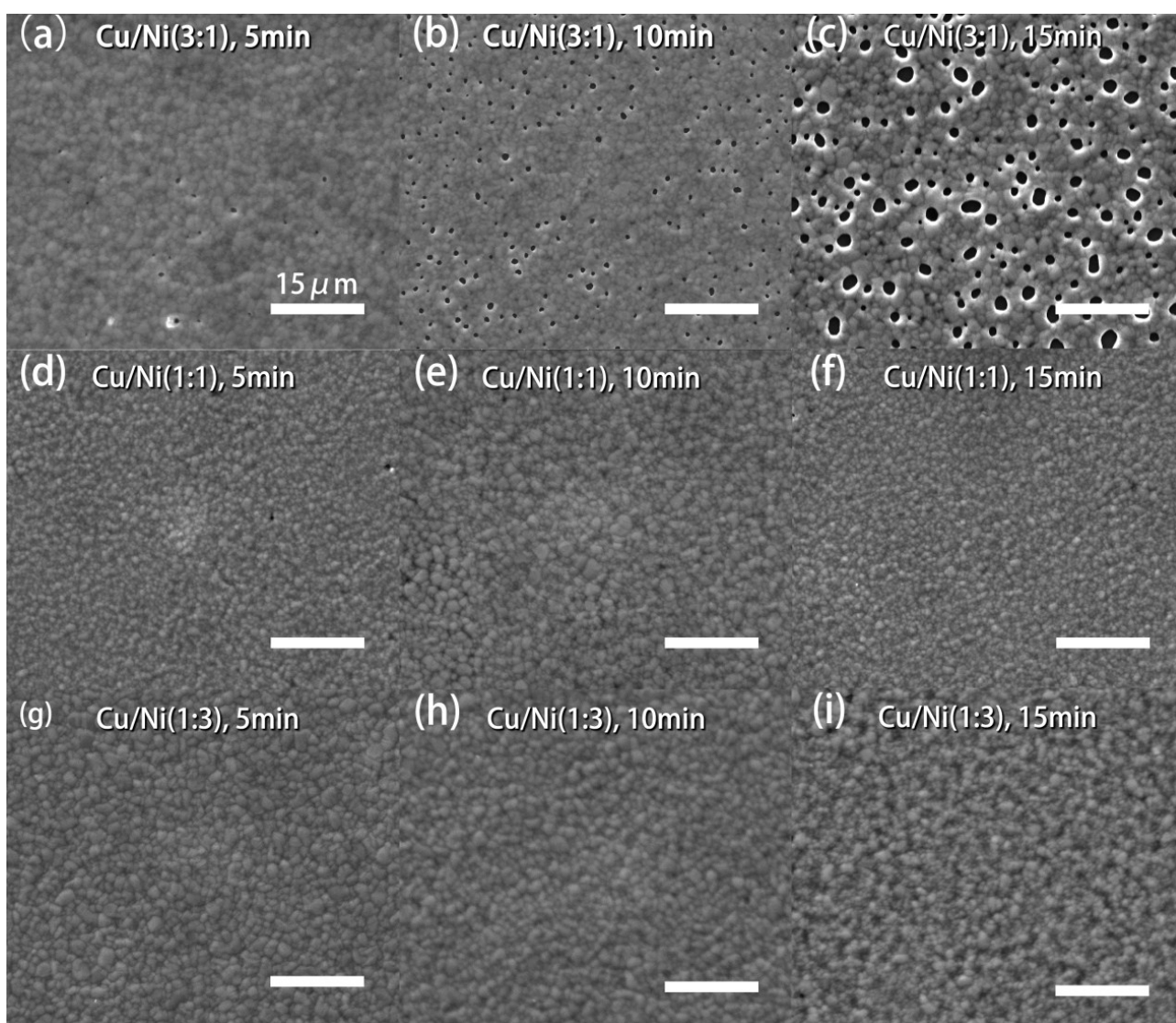


Figure S2. The cross-sectional SEM images of Cu–Ni bilayer-coated samples after graphene growth: (a) Cu/Ni = 3:1, 750 °C; (b)–(d) Cu/Ni = 3:1, 900 °C with different growth time; (e) Cu/Ni = 1:1,

750 °C; (f)–(h) Cu/Ni = 1:1, 900 °C with different growth time; (i) Cu/Ni = 1:3, 750 °C; (j)–(l) Cu/Ni = 1:1, 900 °C with different growth time.

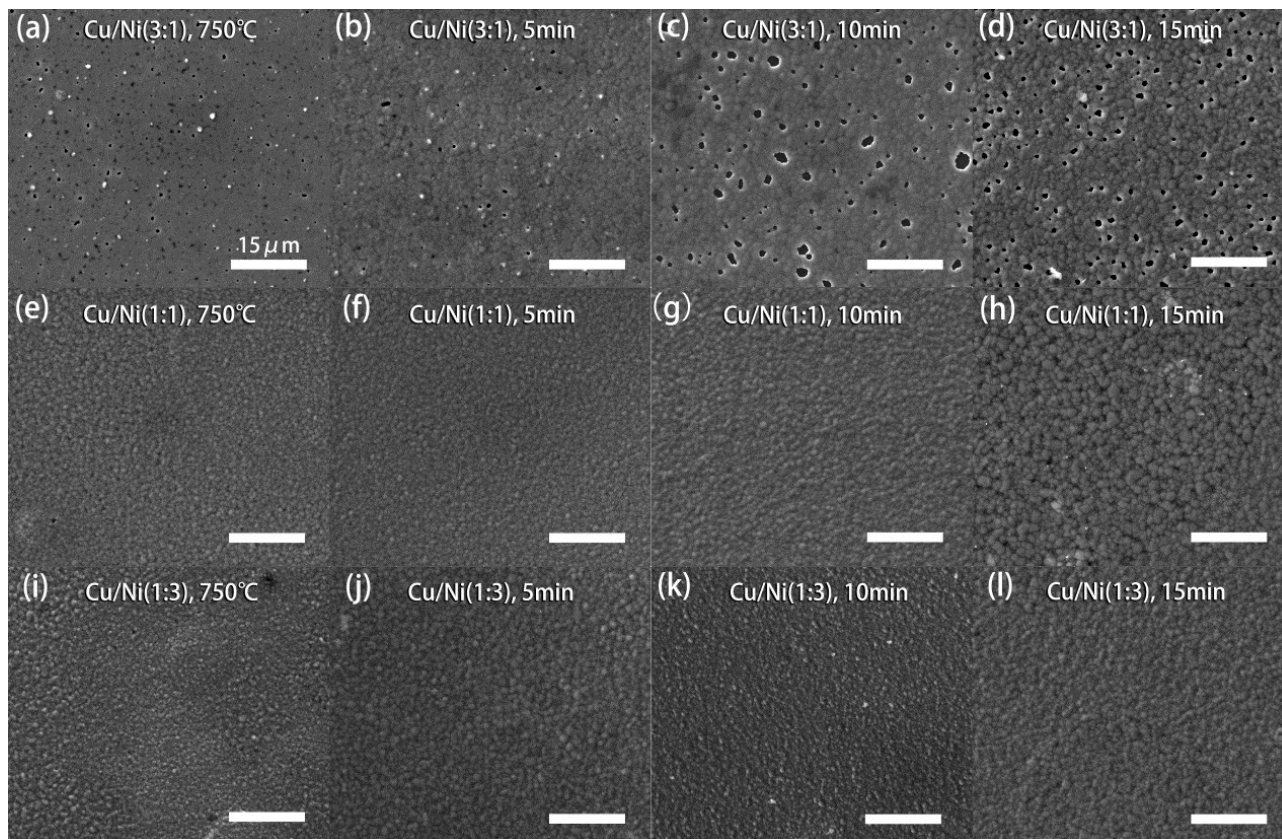


Figure S3. The cross-sectional SEM images of Cu–Ni bilayer-coated samples after various thermal treatments without the introduction of methane: (a) Cu/Ni = 3:1, 750 °C; (b)–(d) Cu/Ni = 3:1, 900 °C with different growth time; (e) Cu/Ni = 1:1, 750 °C; (f)–(h) Cu/Ni = 1:1, 900 °C with different growth time; (i) Cu/Ni = 1:3, 750 °C; (j)–(l) Cu/Ni = 1:1, 900 °C with different growth time.

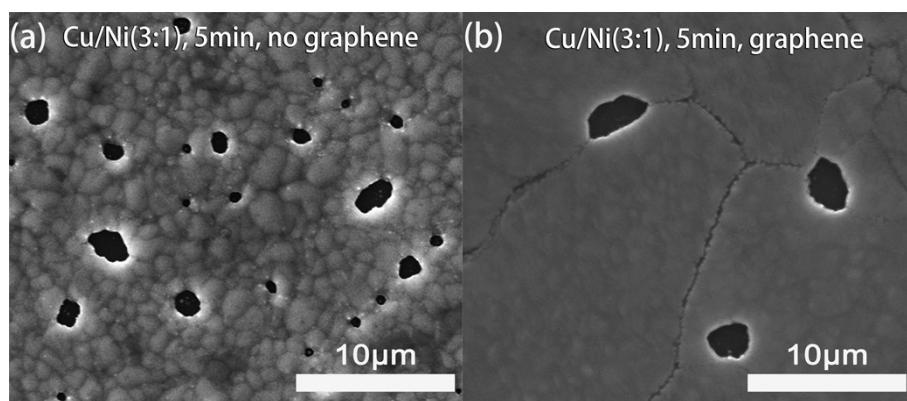


Figure S4. The SEM images of the samples after the CVD process (a) without and (b) with the introduction of CH_4 , respectively.

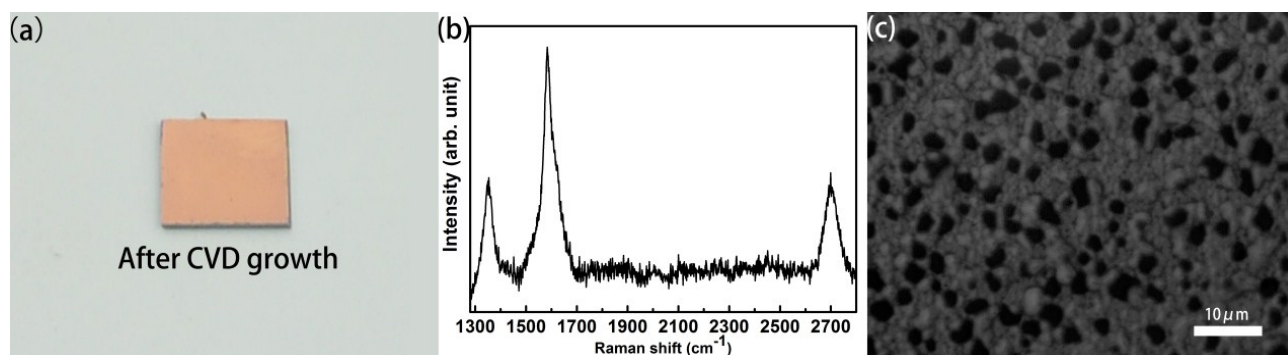


Figure S5. (a) The photo of Cu-coated Si substrate after graphene growth; (b) Typical Raman spectrum of the sample; (c) The SEM image of the sample surface.

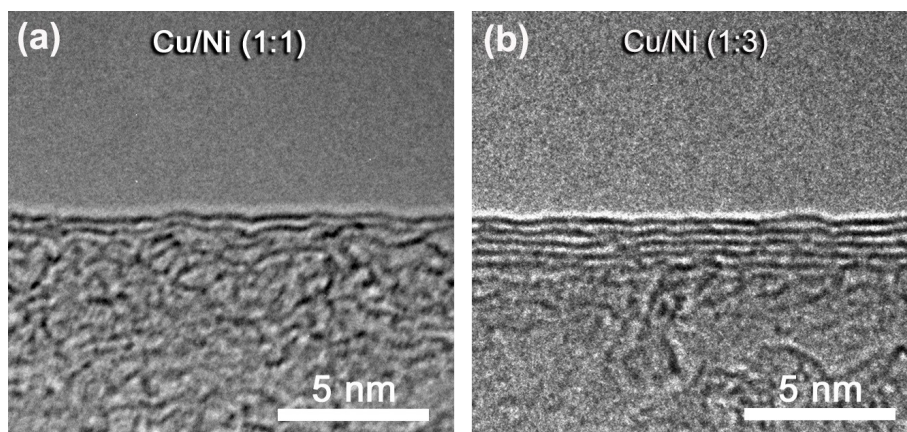


Figure S6. The TEM images of graphene grown on the Cu–Ni catalysts with the Cu/Ni composition of (a) 1:1 and (b) 1:3.