

Rapid Growth of Large-Area Single-Crystal Graphene Film by Seamless Stitching Using Resolidified Copper Foil on Molybdenum Substrate

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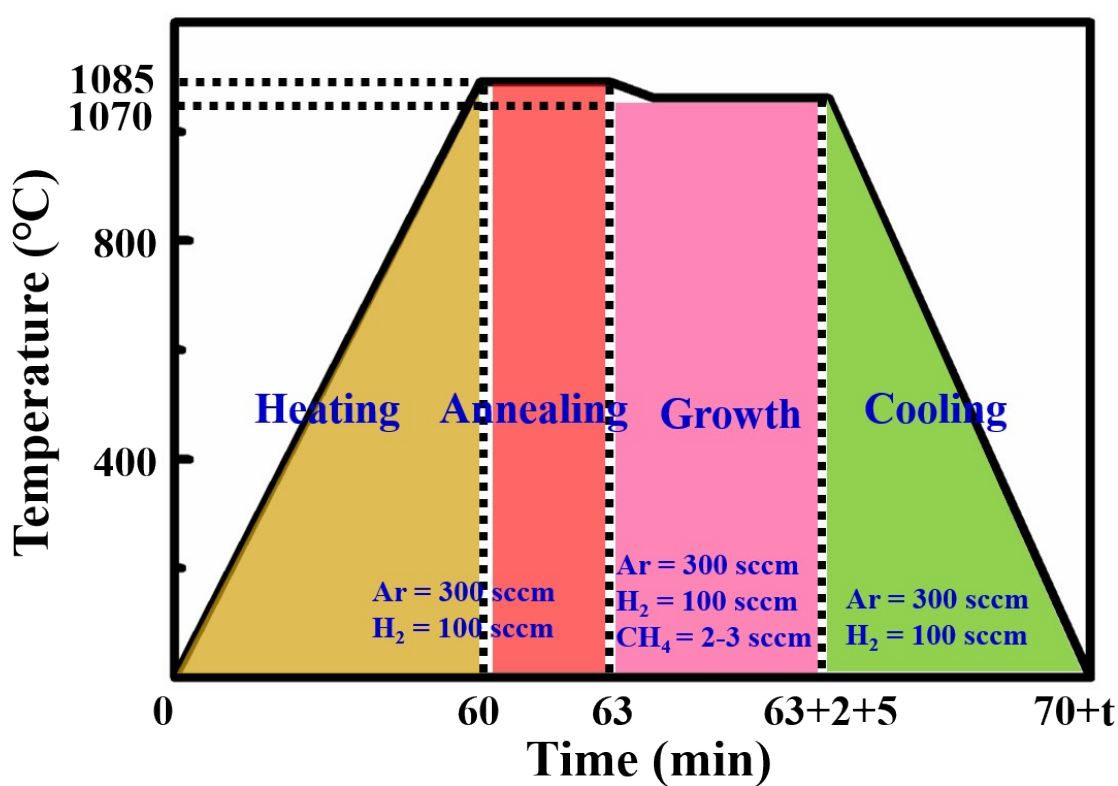


Fig. S1 The process diagram of the single-crystal graphene film growth.

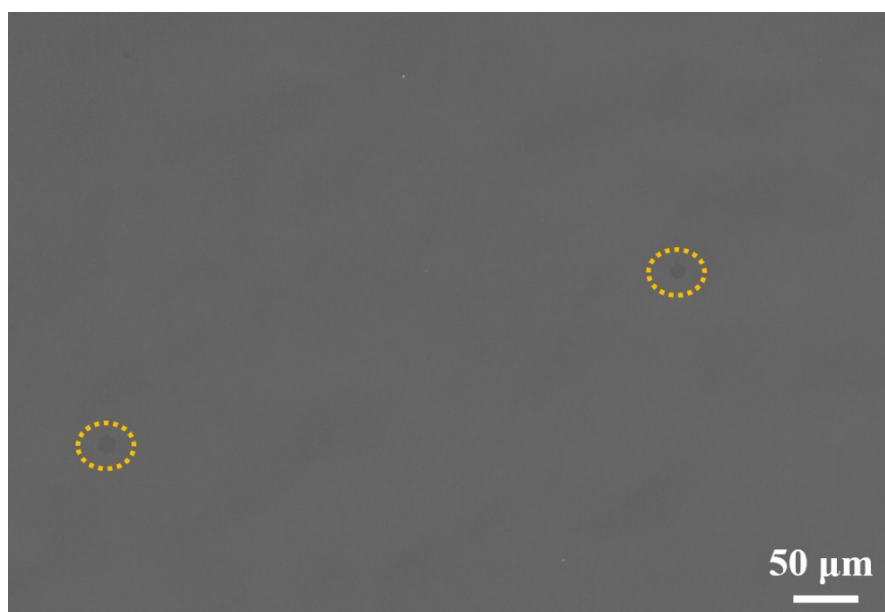
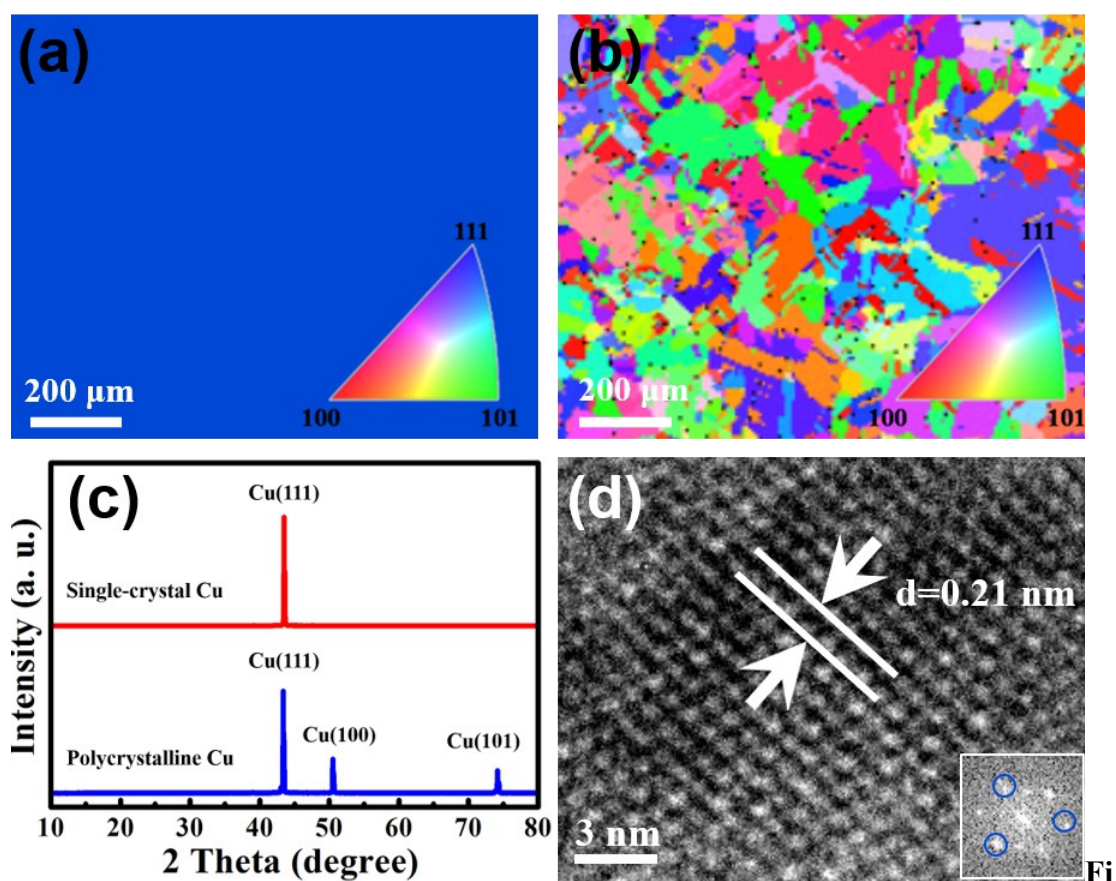


Fig. S2 SEM image of graphene domains after the cooling process of 1085°C -1070°C.



g. S3 (a, b) EBSD mappings and (c) XRD spectra of single-crystal Cu foil after annealing at 1085°C and polycrystalline Cu foil after annealing at 1070°C. Insets of Fig. S3a and Fig.S3b show the inverse pole figure orientation coloring scheme of the

EBSD mappings. (d) HRTEM image of single-crystal Cu foil shows its fcc (111) surface orientation. Inset of Fig.S3d shows the fast Fourier transformation pattern of the corresponding HRTEM image.

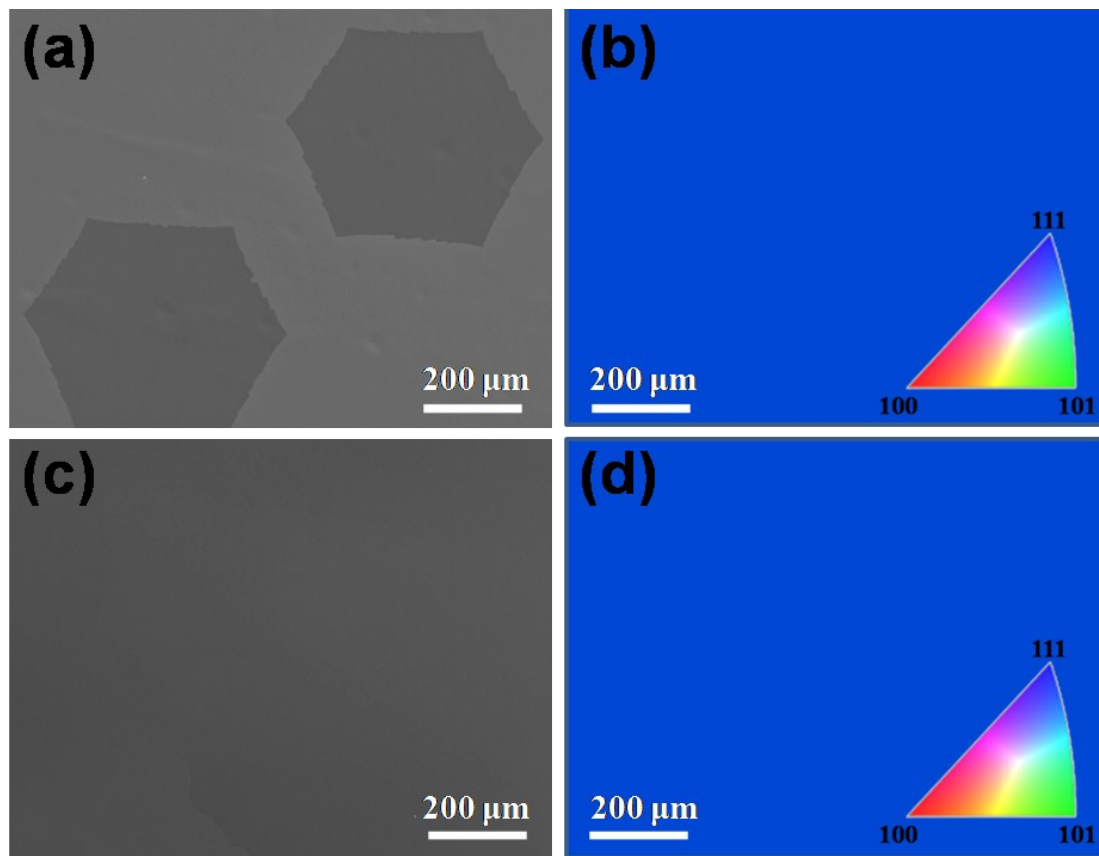


Fig. S4 (a) SEM image and (b) the corresponding EBSD mapping of Cu (111) film on Mo substrate after single-crystal graphene domains growth. (c) SEM image and (d) EBSD mapping of Cu (111) film on Mo substrate after single-crystal graphene film growth. Insets of Fig. S4b and Fig. S4d show the inverse pole figure orientation coloring scheme of the EBSD mappings.

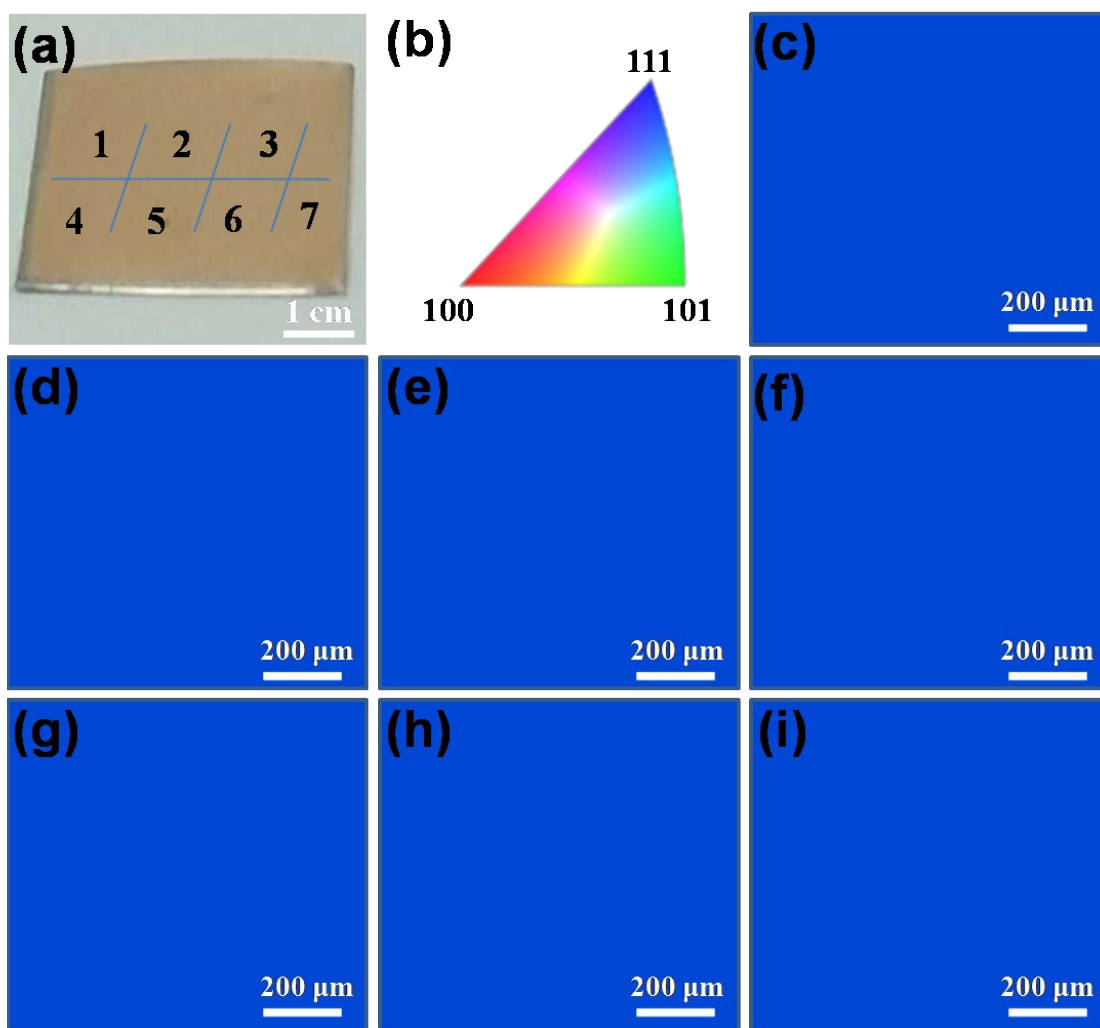


Fig. S5 (a) Digital photo of Cu (111) film on Mo substrate. (b) Inverse pole figure orientation coloring scheme of the EBSD mappings. (c-i) EBSD mappings of Fig. S5a from any seven areas show its fcc (111) surface orientation.

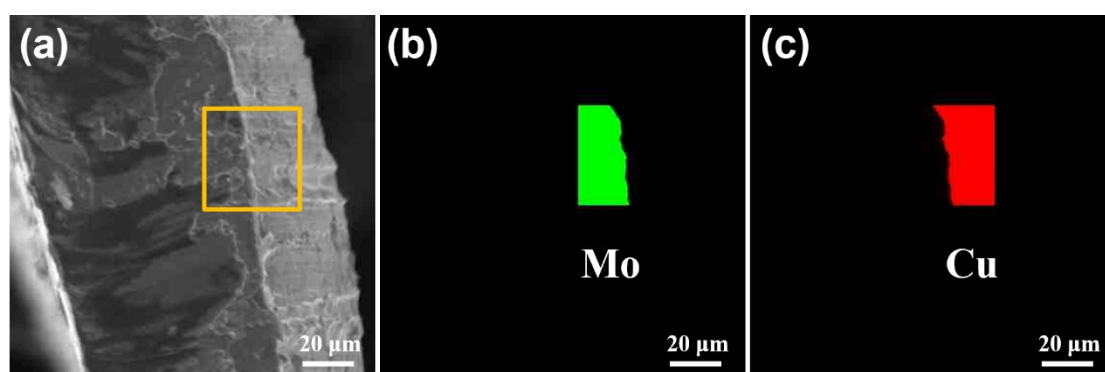


Fig. S6 (a) SEM image of the Cu and Mo substrate cross section, EDS mappings of (b) Mo element and (c) Cu element.

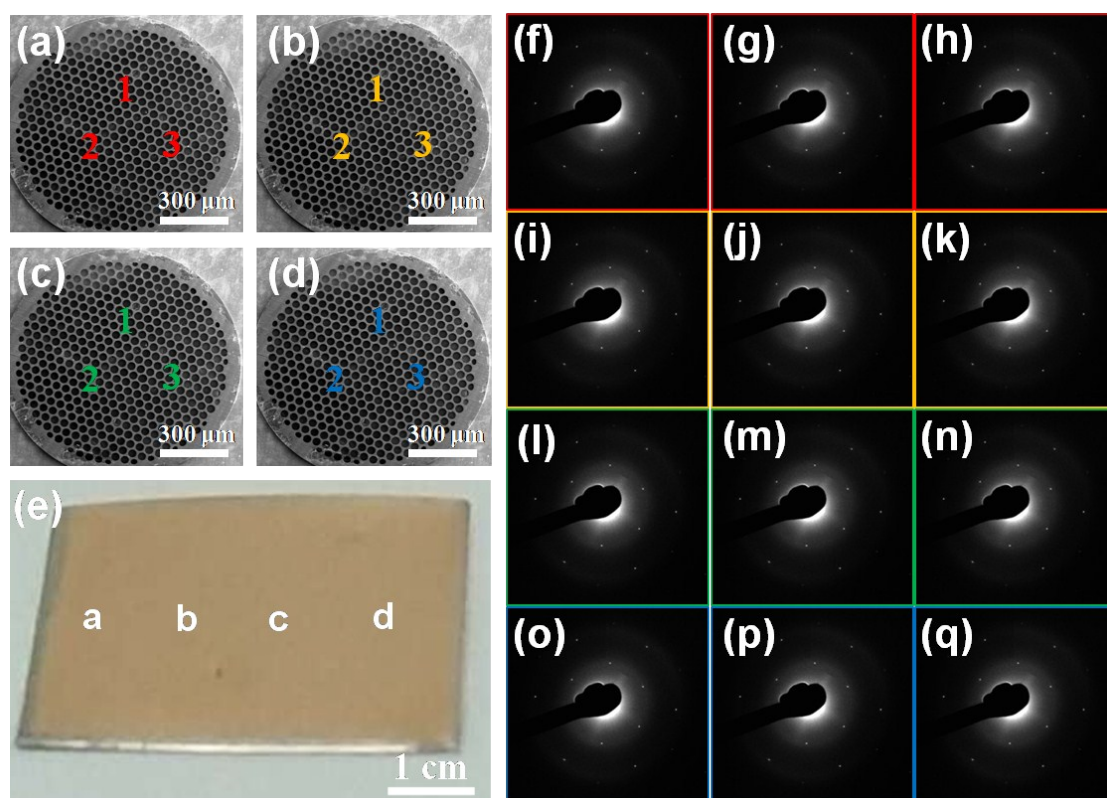


Fig. S7 (a-d) Single-crystal graphene film from selected regions of Fig. S7e. (f-q) SAED patterns from the representative regions indicated in Fig. S7a-S7d.

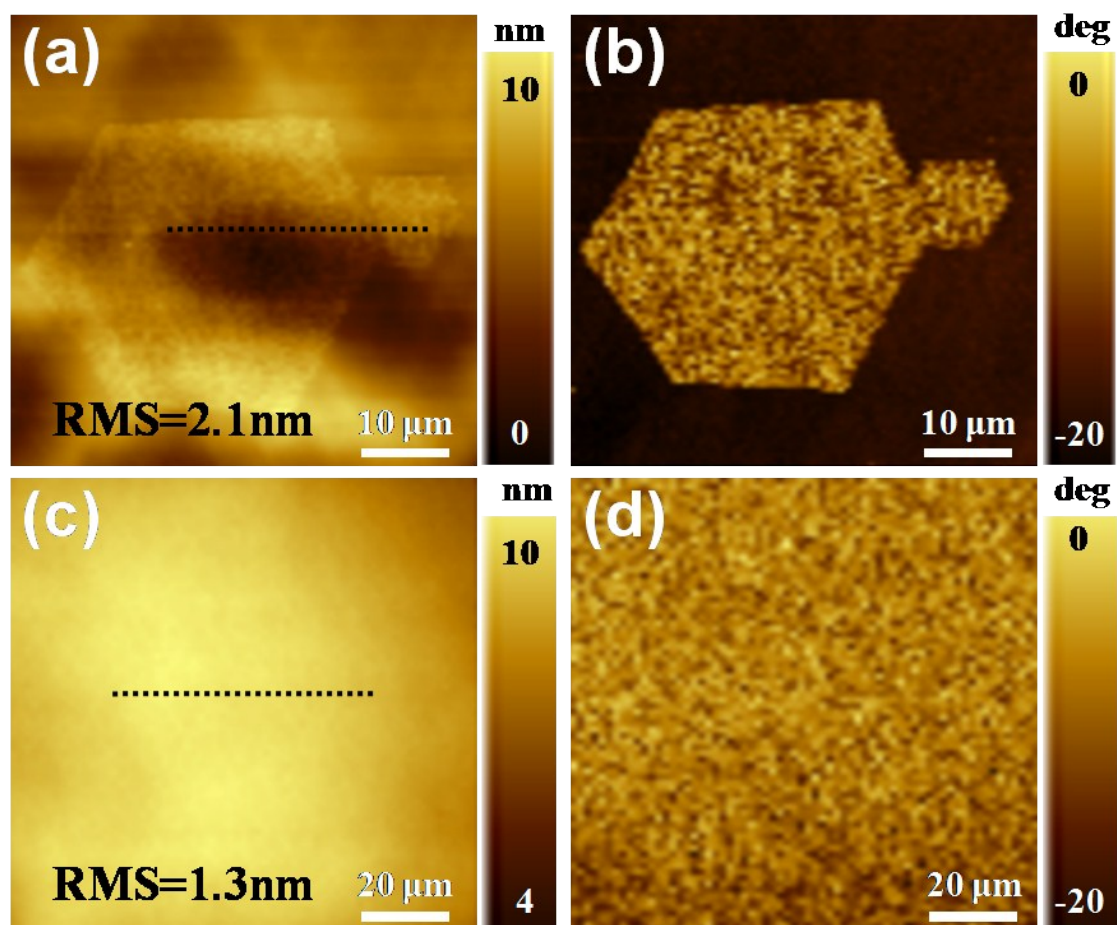


Fig. S8 AFM images of (a) height-mode and (b) phase-mode of the stitched single-crystal graphene domains. AFM images of (c) height-mode and (d) phase-mode of single-crystal graphene film.

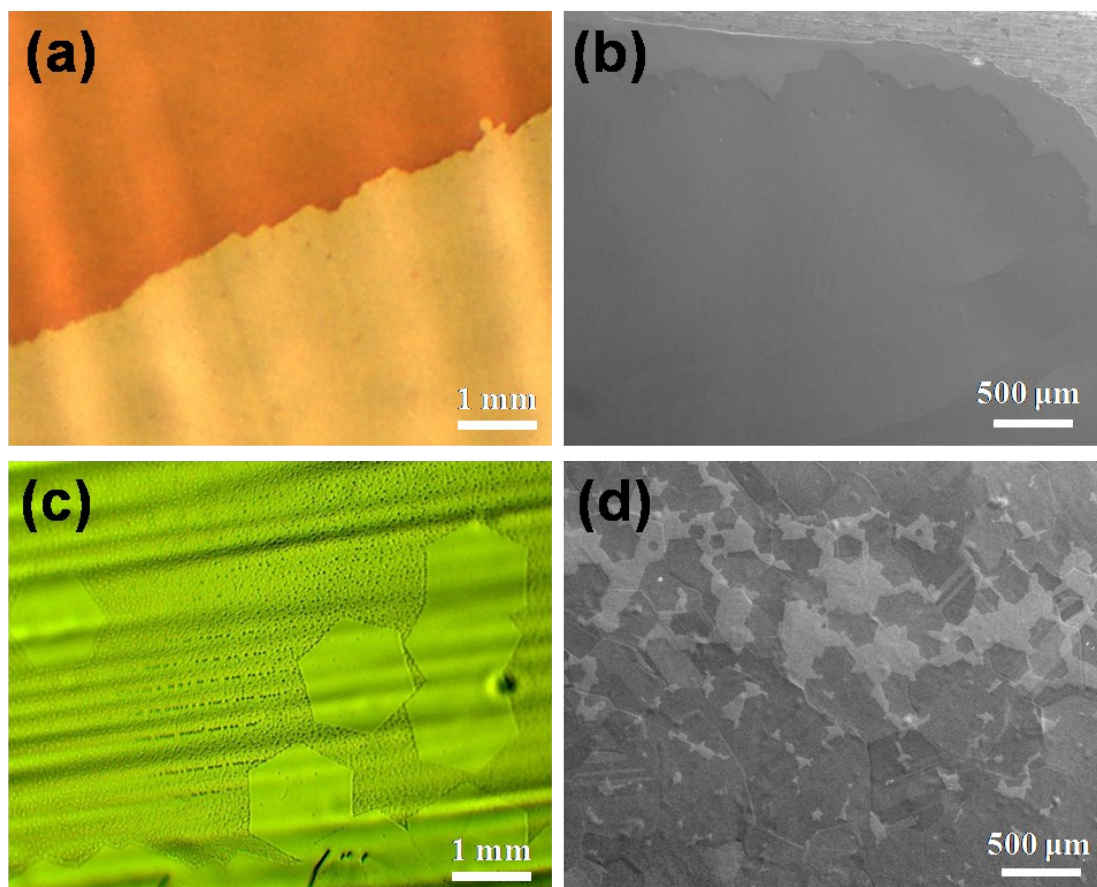


Fig. S9 (a) Optical image and (b) enlarged SEM image of the single-crystal graphene film edge. (c) Optical image and (d) enlarged SEM image of the polycrystalline graphene film edge.

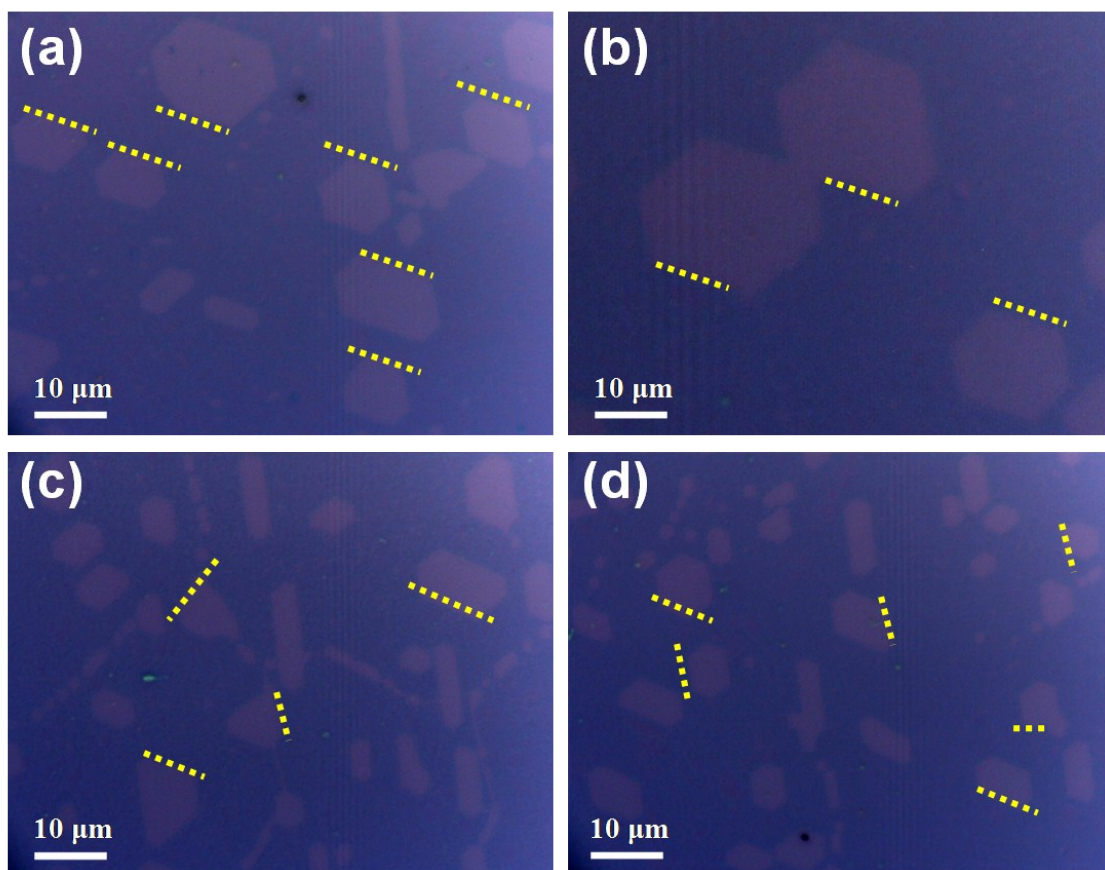


Fig. S10 (a, b) Optical images of the single-crystal graphene films transferred to SiO₂/Si substrates after H₂ etching. (c, d) Optical images of the polycrystalline graphene films transferred to SiO₂/Si substrates after H₂ etching.