Electronic Supplementary Material (ESI) for Nanoscale.

Electronic Supplementary Information

Role of hydrogen in oxygen-assisted chemical vapor deposition growth of millimeter-sized graphene single crystals

Pei Zhao, Yu Cheng, Dongchen Zhao, Kun Yin, Xuewei Zhang, Shaoqian Yin, Yenan Song, Peng Wang, Miao Wang, Yang Xia, Hongtao Wang

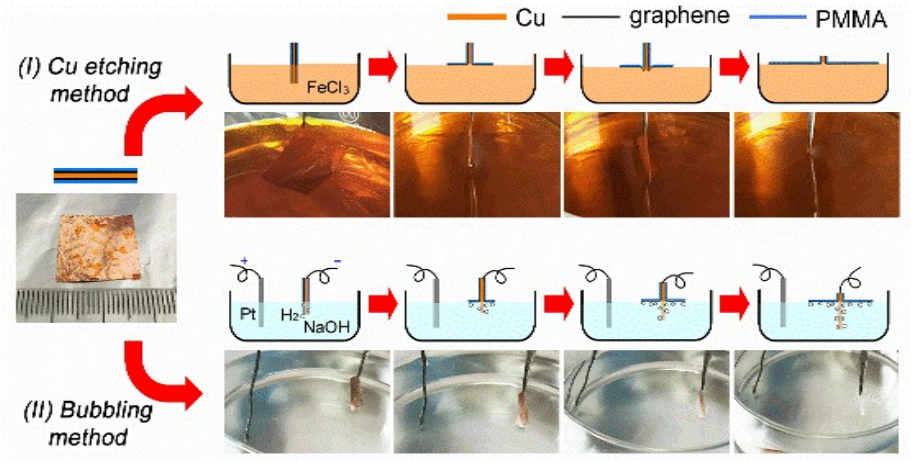

Fig. S1 Simultaneous transfer of as-grown graphene single crystals (GSCs) from both Cu enclosure surfaces using a modified polymer-assisted liftoff technique. In method (I), the Cu foil was perpendicularly submerged into a $FeCl_3$ solution, and as the foil was continuously etched, two PMMA/GSC films were slowly isolated. In method (II), the Cu foil was submerged into a NaOH solution as the cathode for electrochemical bubbling, and a Pt wire was used as the anode. With a constant voltage supply, the PMMA/GSC films were detached very quickly by the generated H_2 bubbles at the film and metal interfaces.

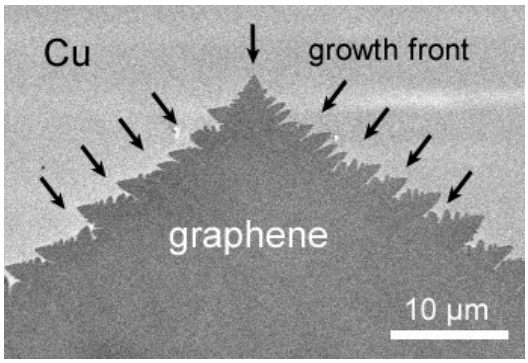

Fig. S2 Typical SEM image of the growth front of a GSC under low H_2 partial pressure P_{H2}.

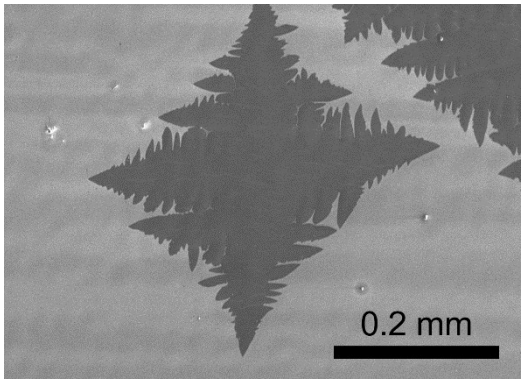

Fig. S3 GSCs grown under low P_{H2} occasionally exhibit grain shapes with four-fold symmetry.

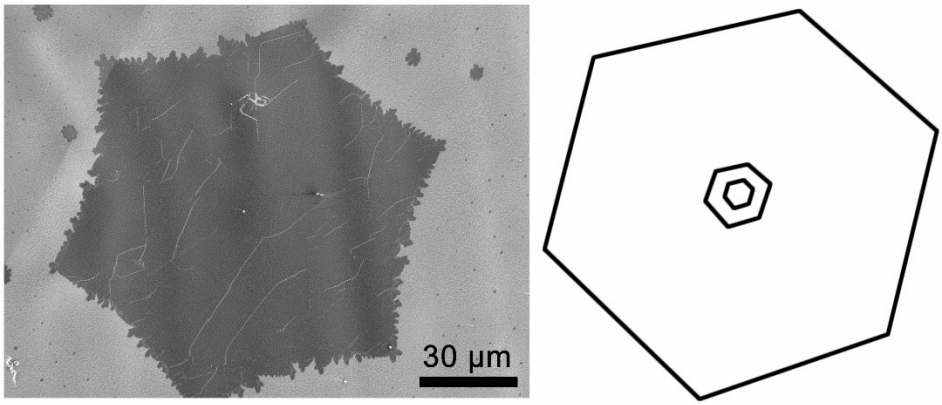

Fig. S4 The adlayers exhibit a hexagonal shape as the first layer and with a Bernal-stacked configuration between the layers for GSCs grown under high P_{H2}.