Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information

Graphene Network for High-Performance Flexible and Transparent Supercapacitors

Xueliu Fan, Tao Chen and Liming Dai*

Center of Advanced Science and Engineering for Carbon (Case4Carbon) and Department of Macromolecular Science and Engineering, Case Western Reserve University, 10900 Euclid Avenue, Cleveland, Ohio, 44106, USA

Email: liming.dai@case.edu.

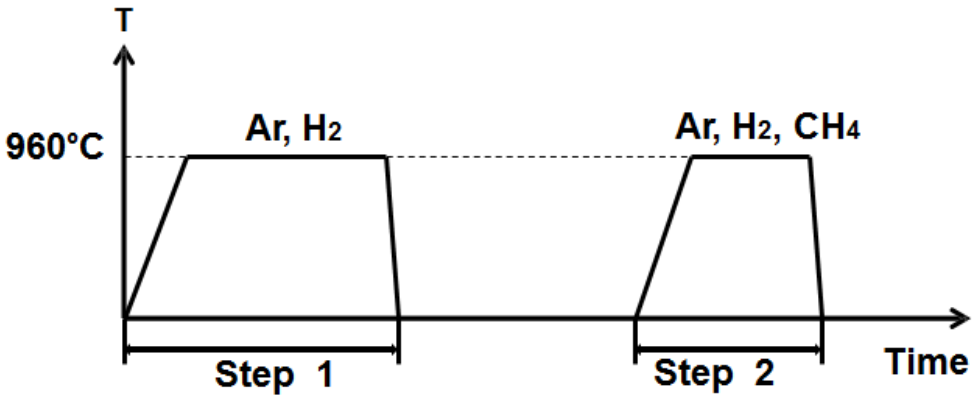

Fig. S1 Schematic diagrams of two-step chemical vapor deposition for the synthesis of graphene network films. Step 1: heating up to 960℃ with a fast cooling process to form copper network; Step 2: at 960℃ for graphene growth on the copper network.

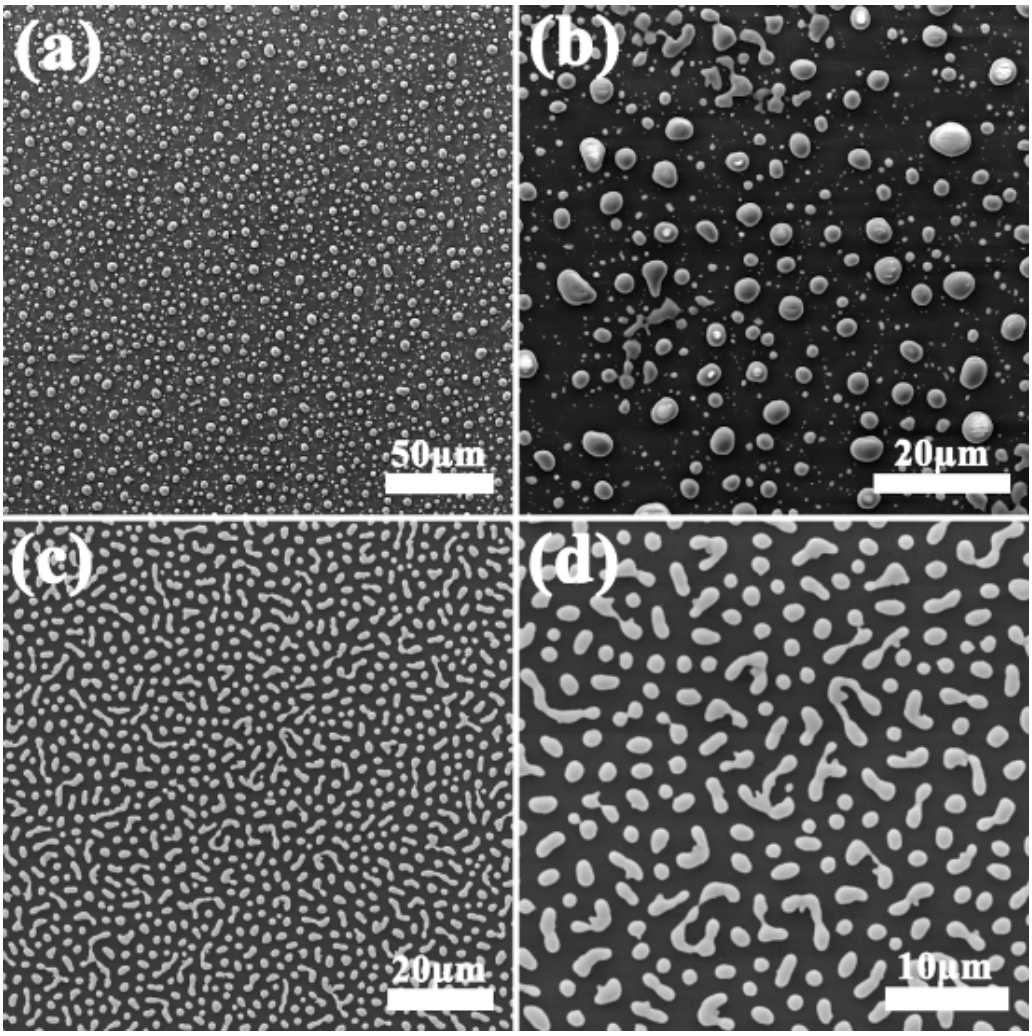

Fig. S2 SEM images of copper network-like structures by annealing 300-nm-thick sputter-coated copper layer on silicon wafers as function of the annealing temperature. a) and b) the dot-like copper formed at 1000℃; c) and d) the finger-like copper formed at 970℃.

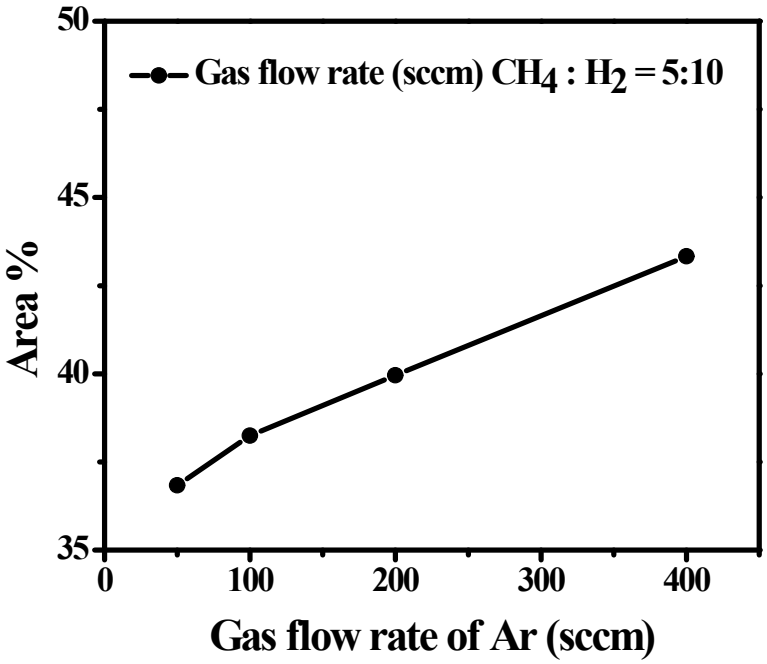

Fig. S3 The surface coverage ratio of the Cu network formed by annealing at 960℃ for 180 s as function of the Ar flow rate (50, 100, 200, and 400 sccm).

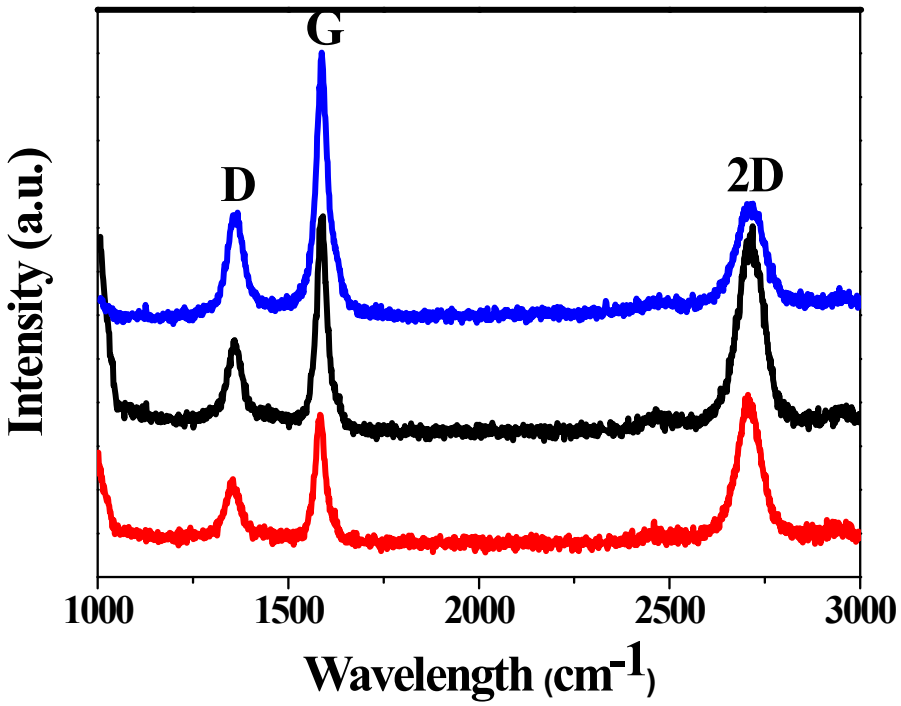

Fig. S4 Raman spectra of the pure GN films transferred onto silicon wafers prepared by the two-step method as function of growth time. The GN films were synthesized at 960℃ with 5 sccm CH_4 under the gas mixture of 200 sccm Ar/5sccm H_2. The exposure time to carbon source for red, black and blue lines are 30s, 90s, 120s respectively.

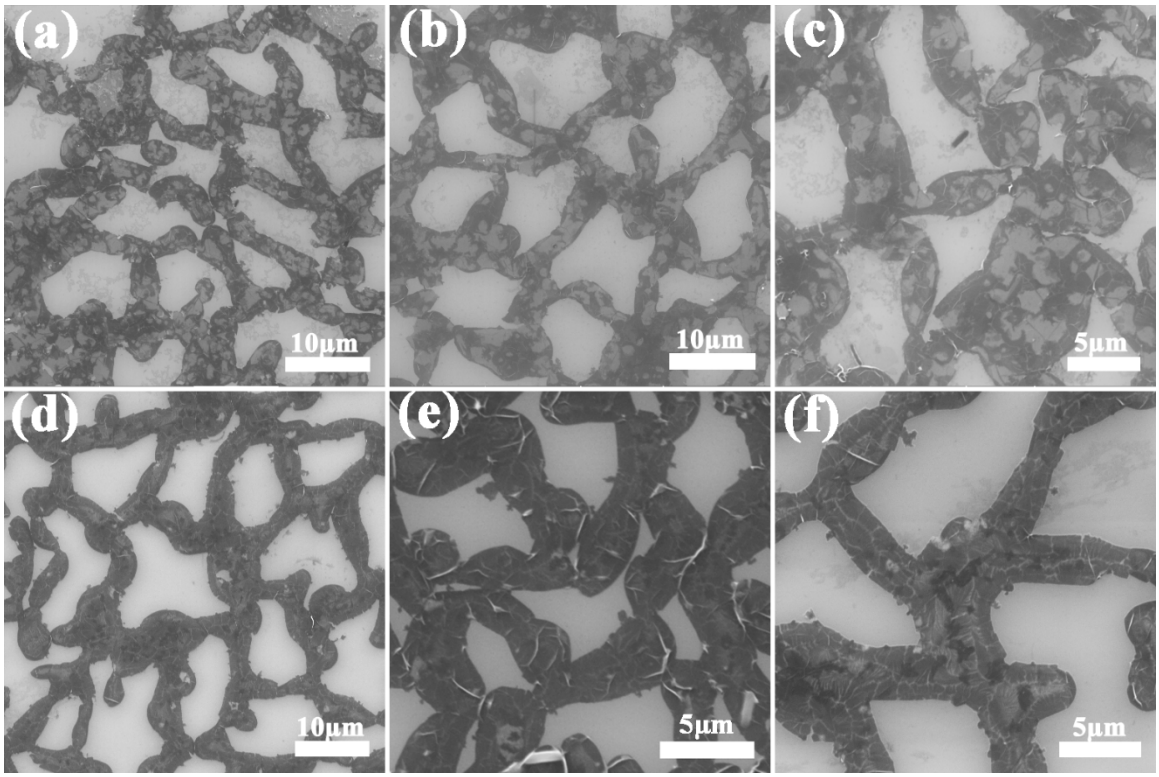

Fig. S5 SEM images of the pure GN films transferred onto Silicon wafers. a), b) and c) the graphene networks formed at 960℃ after 30 s exposure time to carbon source. d), e), and f) the graphene networks formed at 960℃ after 120 s exposure time to carbon source. The gas flowing rate ratio of Ar, H_2 and CH_4 is 200: 5: 5.