

Supplementary Information

Transformation of polymer to Graphene film at partially low temperature

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Materials and Methods

The thermal transform processes of the PMMA to graphene film on Ni substrates (5 μm) are described as follows: the polycrystalline Ni sheets with dimensions of 1 x 1 cm^2 were used as the substrates. The Ni substrates were ultrasonically cleaned with acetone for 10 min and then air blower was used to remove the any remaining particles from the Ni surface. Further, the PMMA (Microchem, weight average molecular weight $M_w = 950,000 \text{ gm/mol}$) was dissolved in anisole solvent, and coated on Ni surface by drop method (25 μl of PMMA) and then dried it by hotplate. Next, we prepared sandwich structures by using PMMA as shown in Figure 1 (B). We manually generated pressure on the sandwich structures by fixing the screws. Finally, the sandwich structures were placed in an annealing system. The thermal transformation process was carried out under low vacuum such as $1 \times 10^{-1} \text{ Pa}$ and partially low temperatures. We used (ULVAC-RIKO MILA-5000) annealing lamp to anneal the sandwich structures at different temperatures (650 to 800 $^\circ\text{C}$) for 10 min.

Results and discussion

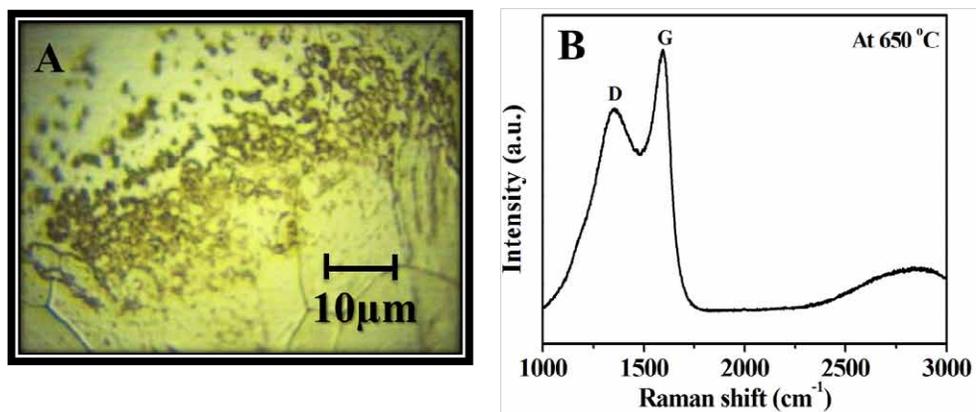


Figure 1S (A) optical image and (B) their Raman spectrum shows the graphene did not form after annealing of polymer at 650 °C for 10 min.

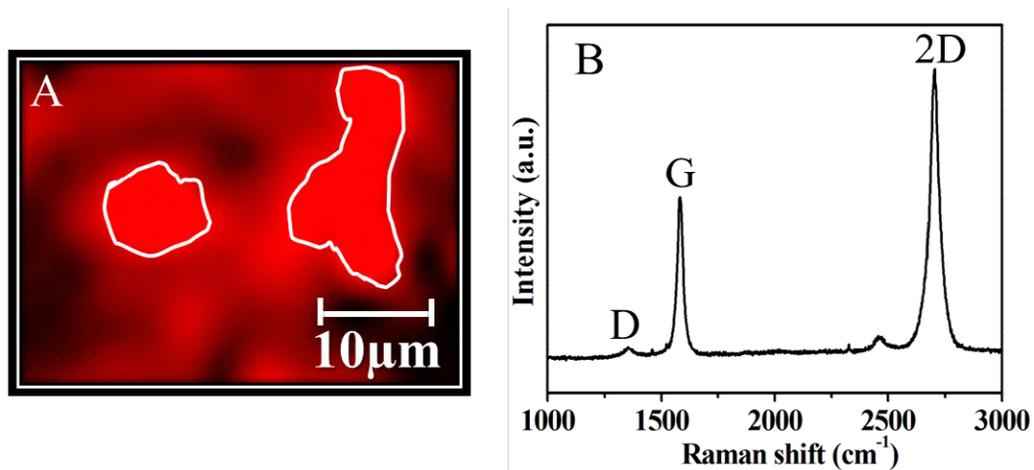


Figure 2S (A) Raman mapping image and (B) their Raman spectrum shows the patches of single layer graphene (red contrast) formed after annealing of polymer at 800 °C for 10 min.