

Electronic Supplementary Information

Preparation of High-Quality Graphene Using Triggered Microwave

Reduction under Air Atmosphere

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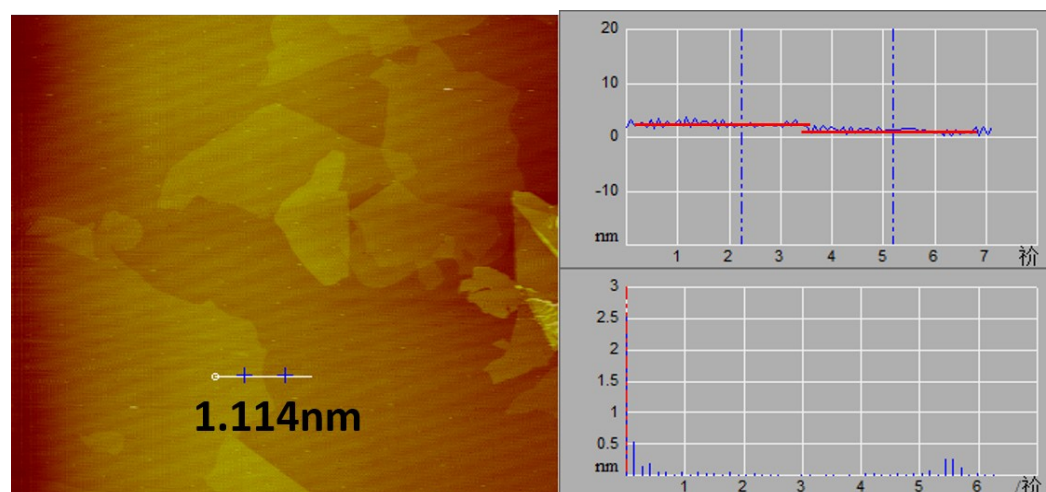


Fig. S1. AFM result of GO, and the thickness is 1.114 nm, which indicates GO is monolayer. The two vertical bars in the right figure, which is perpendicular to the red line, correspond to the position of the two "+" marks in the left figure.

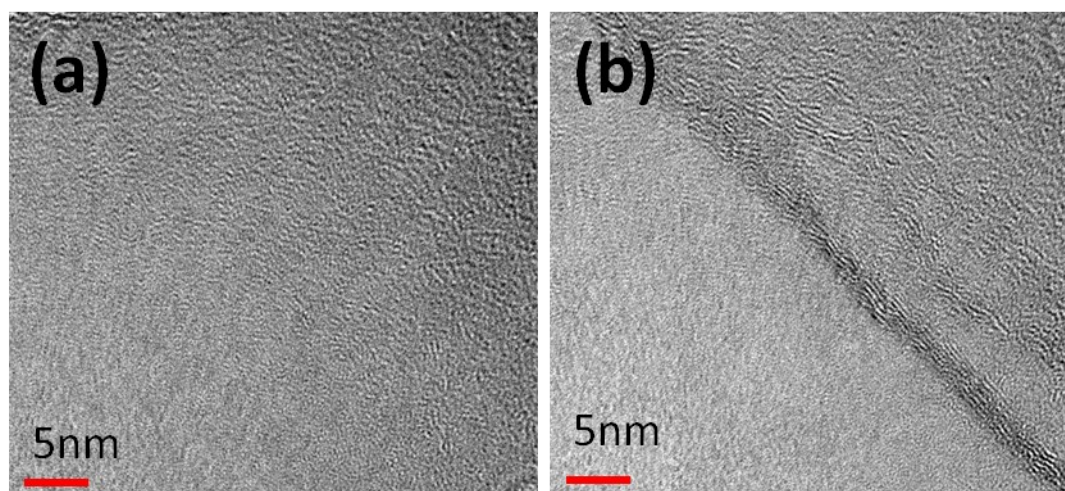


Fig. S2. (a) TEM result of MW-rGO. (b) TEM result of MW-rGO edge.

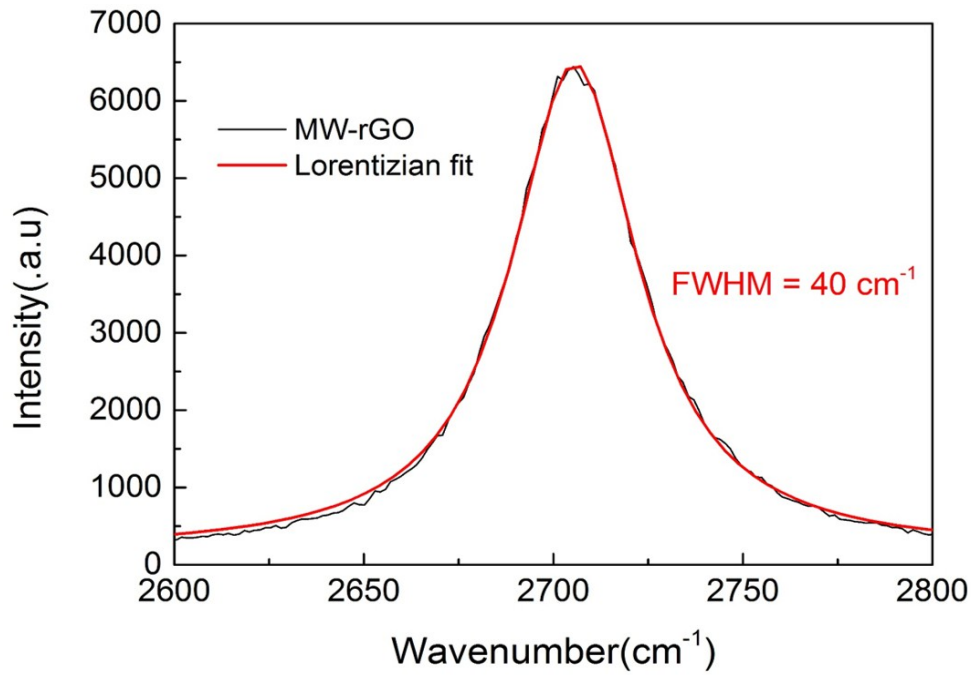


Fig. S3 The 2D band of MW-rGO and the lorentzian fit of 2D band. The FWHM of perfectly symmetrical 2D band is 40 cm^{-1} , which suggests the presence of monolayer MW-rGO.

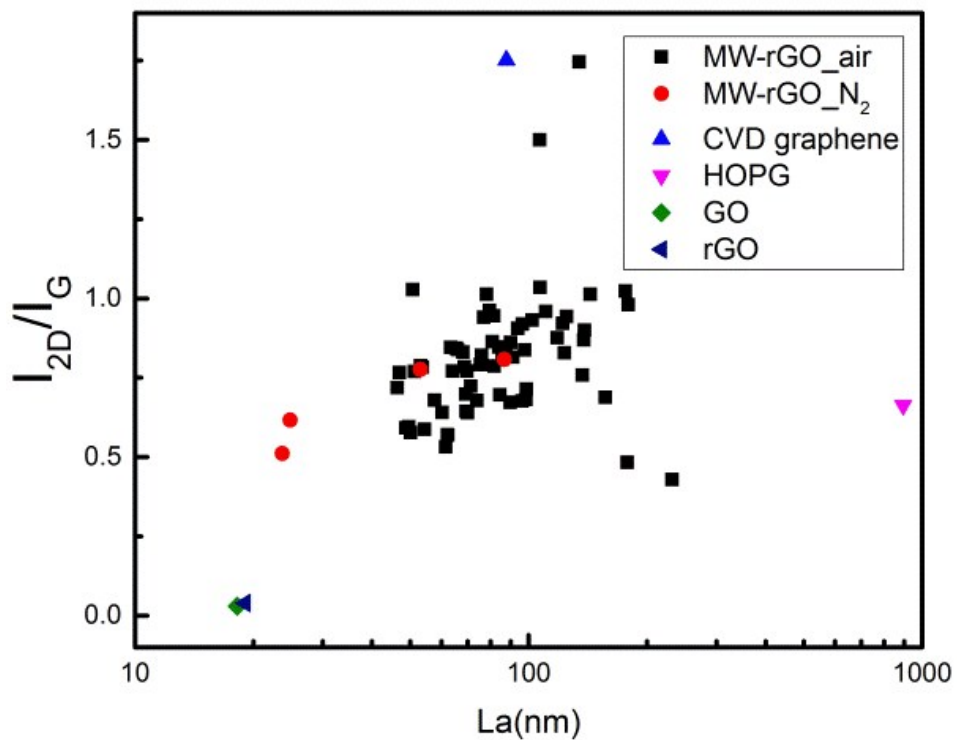


Figure S4. Evolution of I_{2D}/I_G ratio versus the crystal size (L_a) for MW-rGO_{air}, MW-rGO_{N₂}, HOPG, CVD-graphene, rGO, and GO.

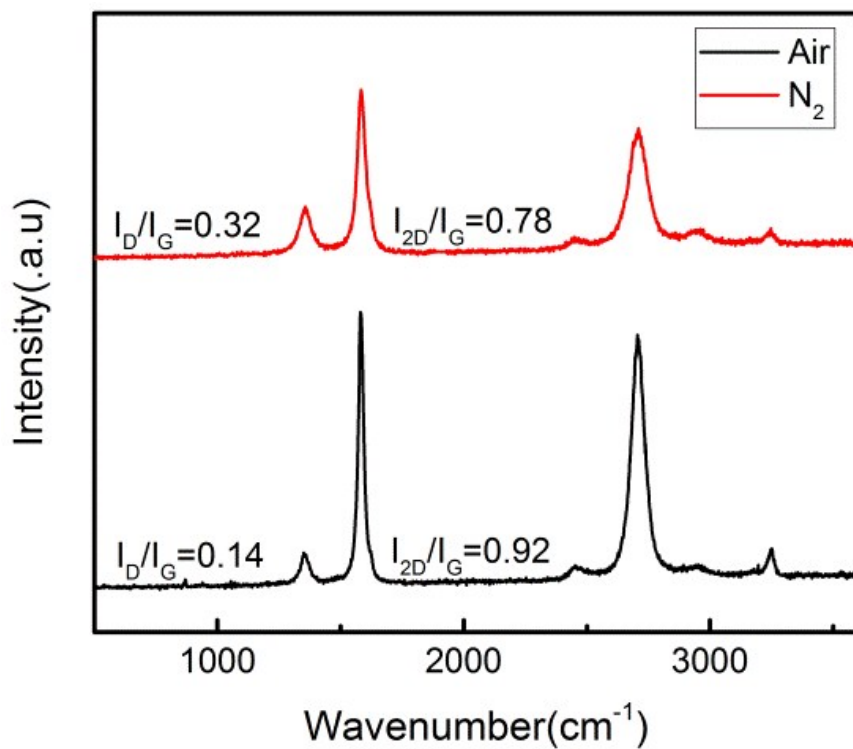


Figure S5. Raman spectra of MW-rGO prepared under air and nitrogen.

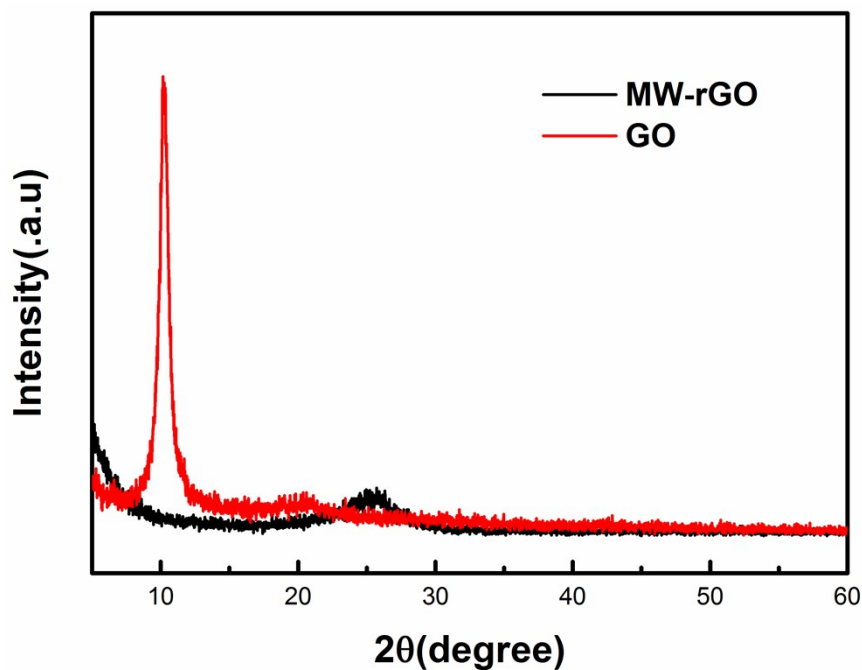


Figure S6. The XRD results of GO and MW-rGO. In comparison to GO, the peak at $2\theta=10.2^\circ$ disappeared in the XRD result of MW-rGO, which reveals that GO obtained an effective reduction. Moreover, XRD result shows a faint peaks at $2\theta=25.6^\circ$.

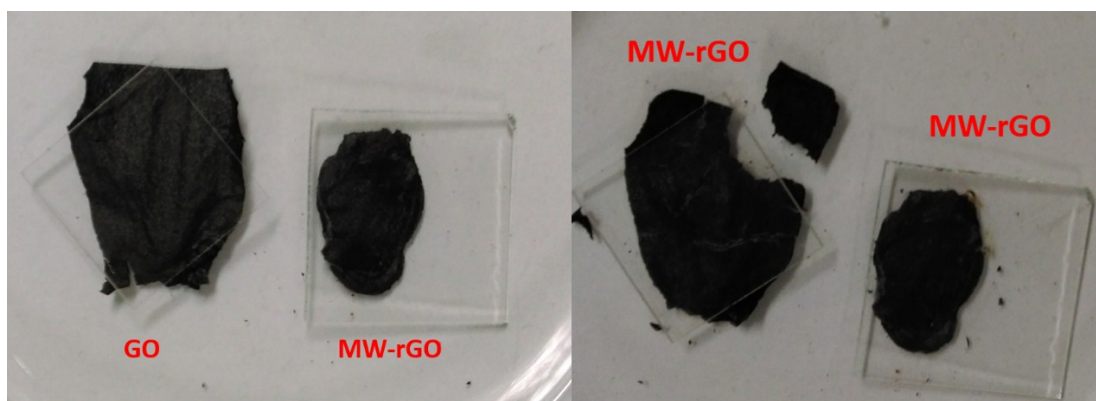


Fig. S7 MW-rGO fabricated under non-contact condition, which signifies graphene-triggered microwave reduction is not only thermal effect.

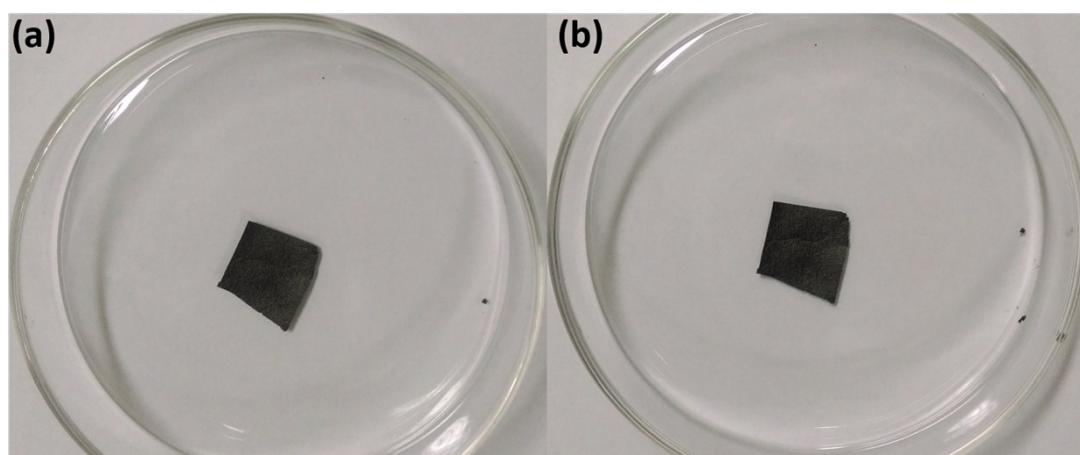


Fig. S8 (a) GO paper without microwave irradiation; (b) GO paper with 30s microwave irradiation in a microwave oven, which is different from the Figure S6.

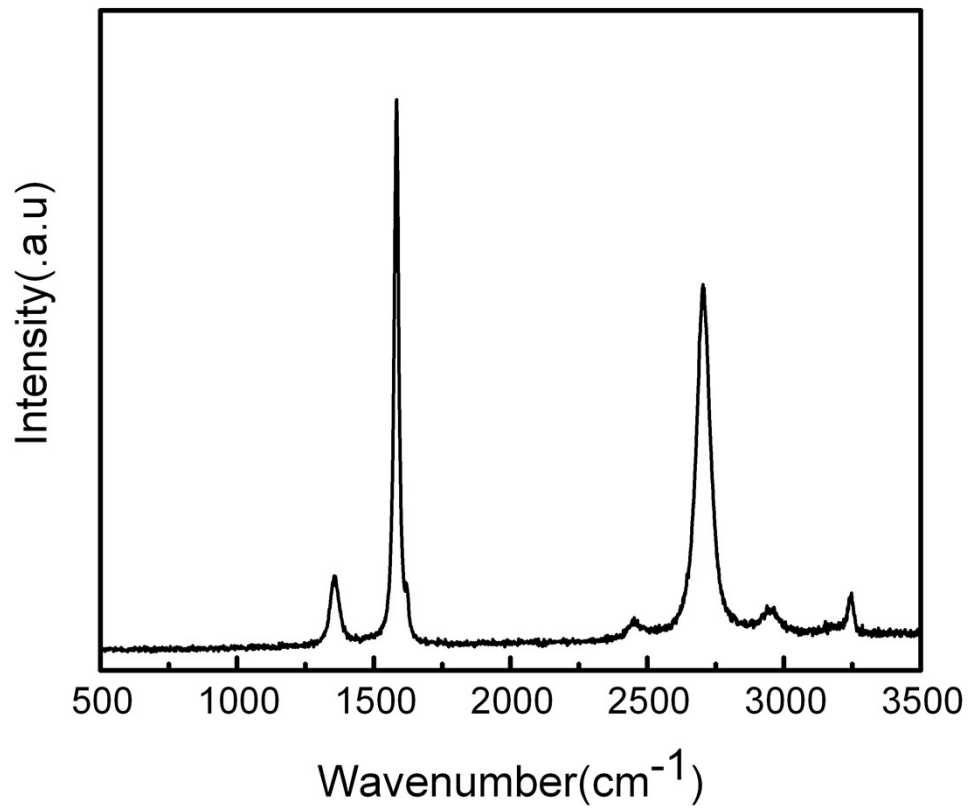


Fig. S9 Raman spectrum of MW-rGO prepared by GO paper which was not treated by 1% CaCl₂ solution, and the results is similar with that of MW-RGO prepared by GO paper which was treated by 1% CaCl₂ solution.

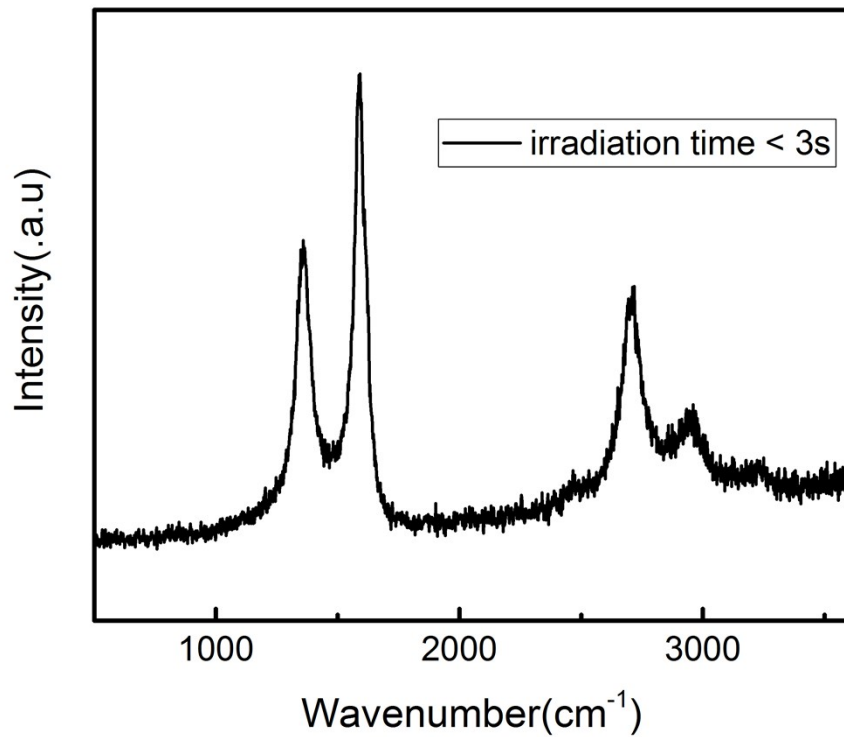


Figure S10. Raman spectrum of MW-rGO, whose irradiation time is less than 3s.

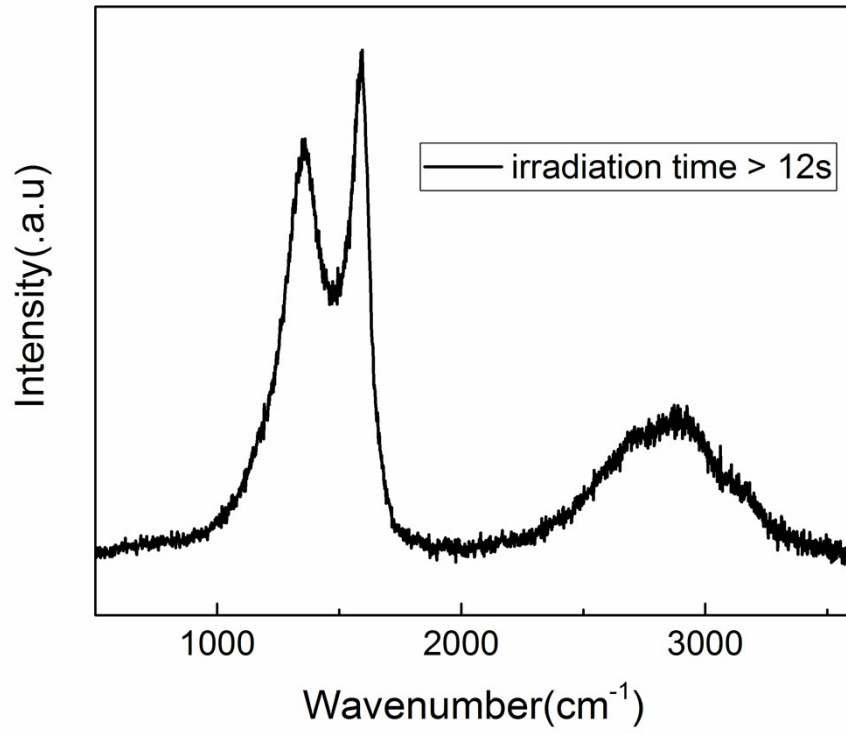


Figure S11. Raman spectrum of MW-rGO, whose irradiation time exceed 12s.

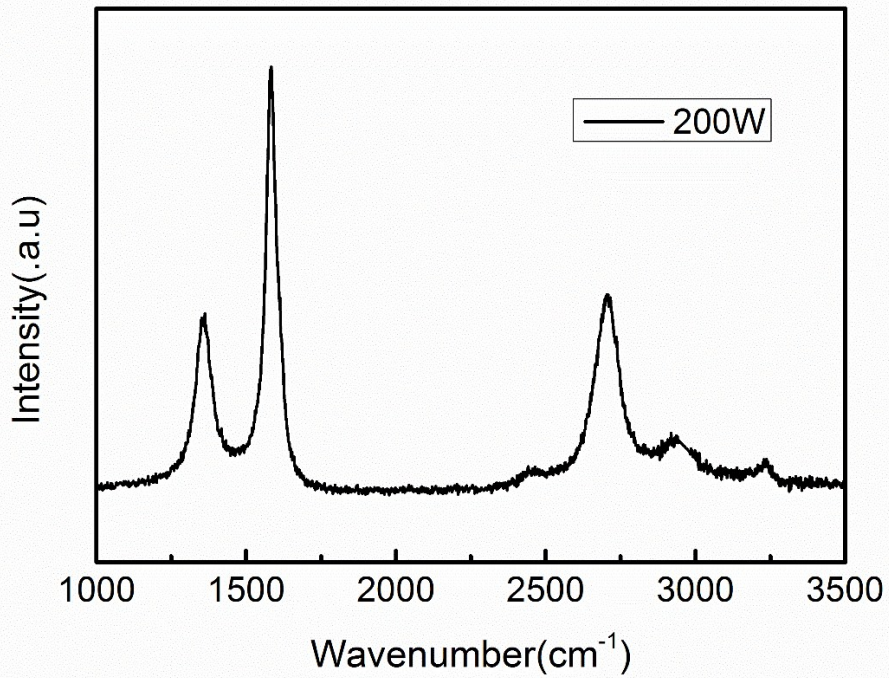


Fig. S12 Raman spectrum of MW-rGO fabricated at 200W irradiation power.

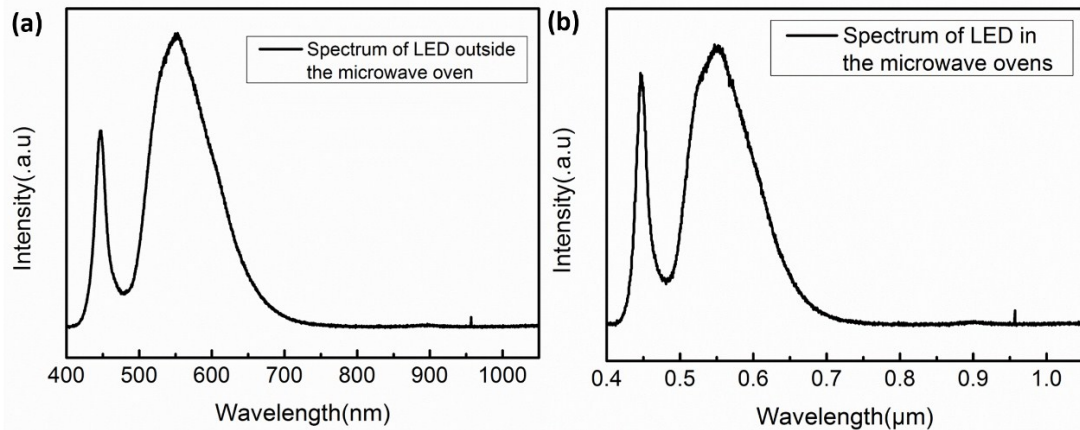


Fig. S13 Spectrum of LED outside/in the microwave oven, indicating that the spectra measured inside and outside are the same.

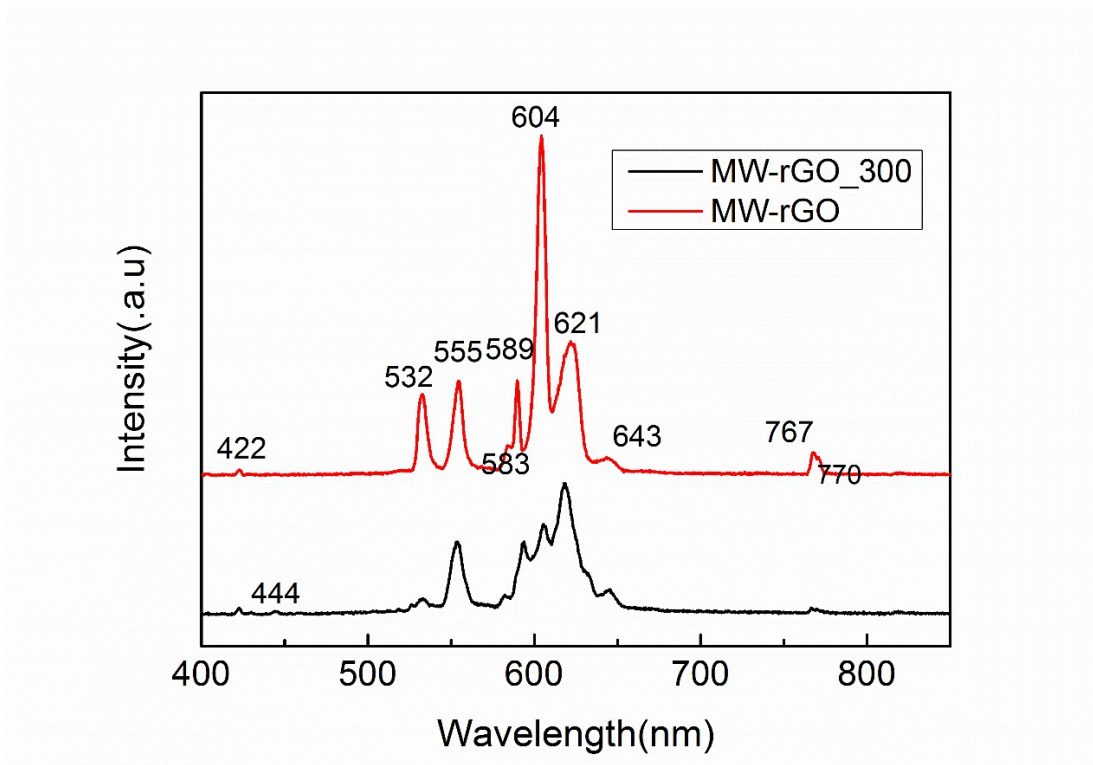


Fig. S14 Arc spectra of MW-rGO and MW-rGO_300. MW-rGO and MW-rGO_300 owned similar spectra, which signified the same reduction process.

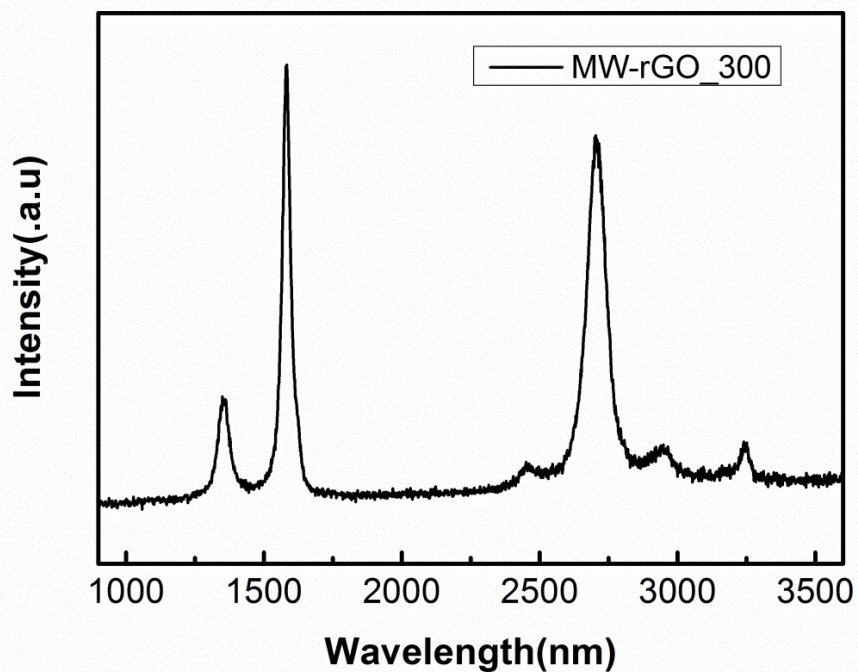


Fig. S15 Raman spectrum of MW-rGO_300, and the result is consistent with ref [42].

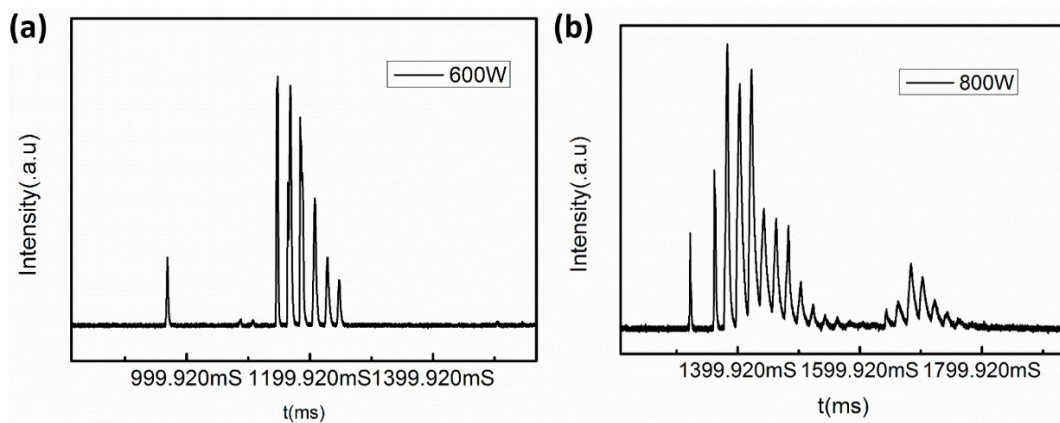


Fig. S16 Time response spectra of different irradiation powers, and the time interval between two adjacent peaks is 20 ms.

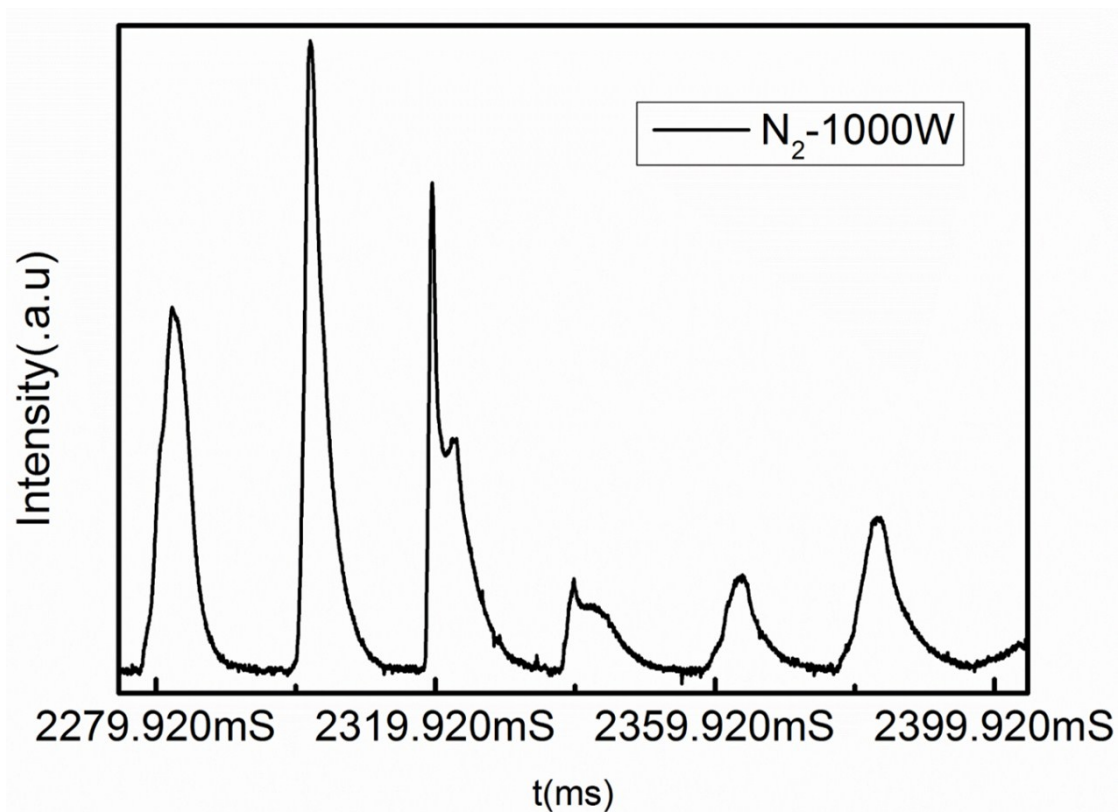


Fig. S17 Time response spectra under N₂ atmosphere, and the time interval between two adjacent peaks is 20 ms.

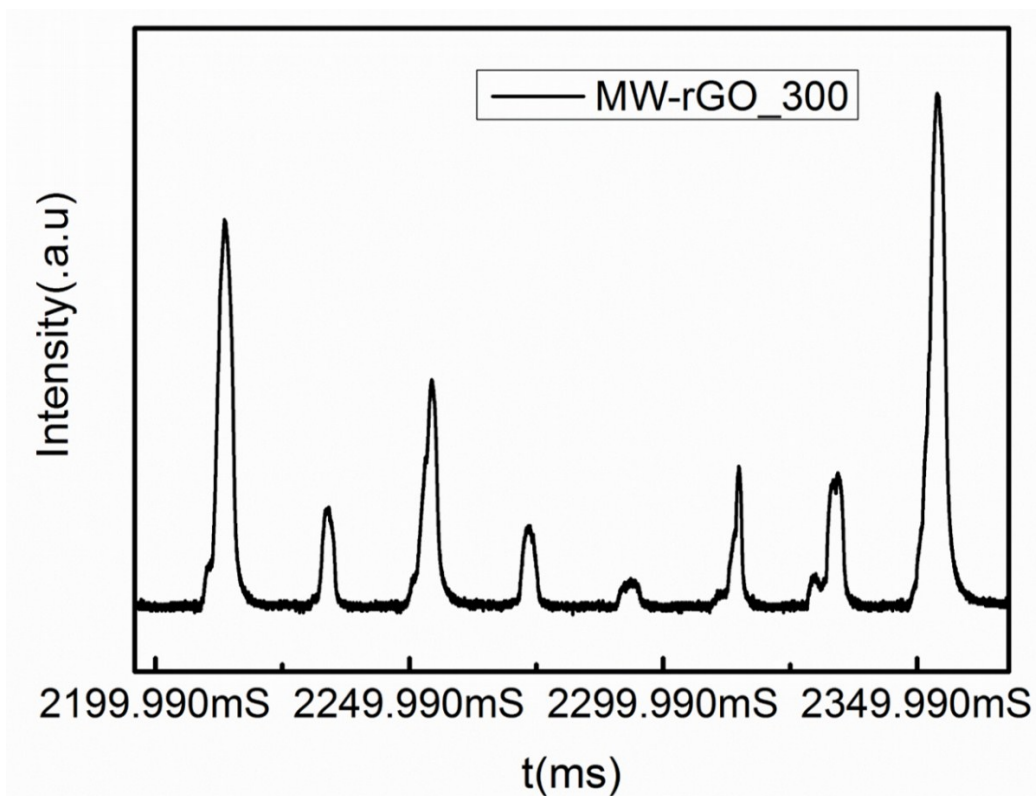


Fig. S18 Time response spectra of MW-rGO_300, and the time interval between two adjacent peaks is 50 ms.

20 ms.

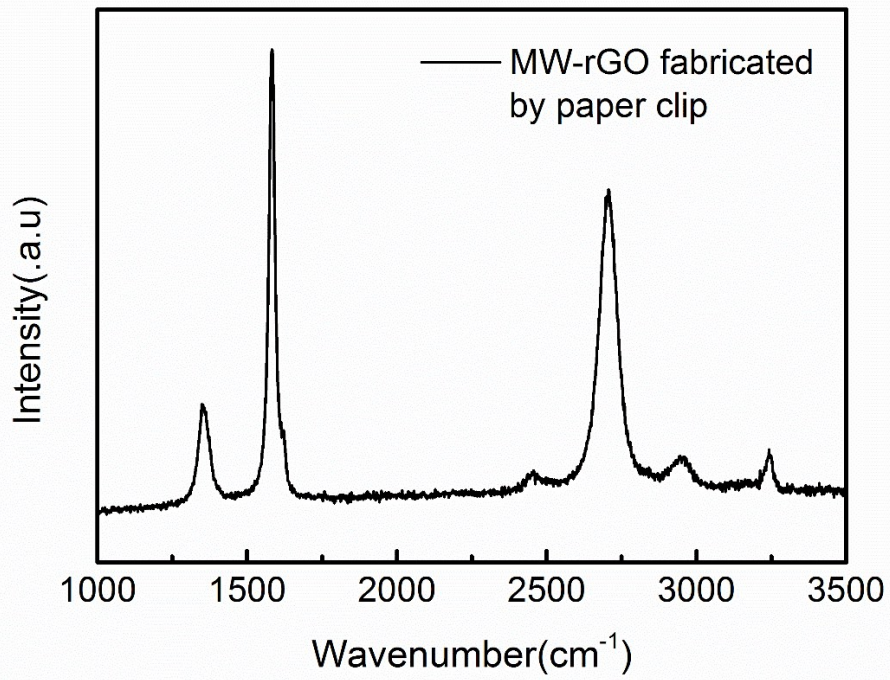


Fig. S19 Raman spectrum of MW-rGO fabricated by paper clip triggered microwave reduction, suggesting the MW-rGO fabricated by paper clip triggered microwave reduction is high-quality.