

Supporting Information

Sulfur-doped graphene laminates for EMI shielding applications

Faisal Shahzad^{a,b}, Pradip Kumar^a, Seunggun Yu^a, Seunghwan Lee^a, Yoon-Hyun Kim^c, Soon Man Hong^{a,b}, Chong Min Koo^{a,b,*}

^a*Center for Materials Architecturing, Korea Institute of Science and Technology, Hwarangno*

14-gil 5, Seongbuk-gu, Seoul 136-791, Republic of Korea

^b*Nanomaterials Science and Engineering, University of Science and Technology, 176 Gajung-*

dong, 217 Gajungro, Yuseong-gu, Daejeon 305-350, Republic of Korea

^c*R & D Center, Chang Sung Corporation, 11B-9L, Namdong Industrial Area 320, Seunggicheon-*

ro, Namdong-gu, Incheon, Republic of Korea

*Corresponding author. Tel.: +8229586872; Fax: +8229585309.

E-mail address: koo@kist.re.kr (C.M. Koo).

Fig. captions

Fig. S 1 Schematic of high temperature furnace with gas fittings.....28

Fig. S 2 (a) TGA and (b) DSC plot of GO.....29

Thermal reduction of GO and safety implications:

Ferocious decomposition events occurred during heating process around a temperature of 200 °C), resulting in spread of rGO powder throughout the tube furnace. The event was more violent when larger amounts of GO (> 300 mg) were used to produce rGO or SrGO flakes. In such cases, special kinds of tubular insert were manufactured to avoid the wastage of product and to carry out the doping reactions smoothly. As a safety precaution, thermal reduction of a large amount of GO is not recommended in glass tubular furnace as the pressure generated during thermal reduction is enough to break the quartz tube. These events were reproducible and an optimum amount of freeze dried GO was used to produce enough rGO for experimental purpose.

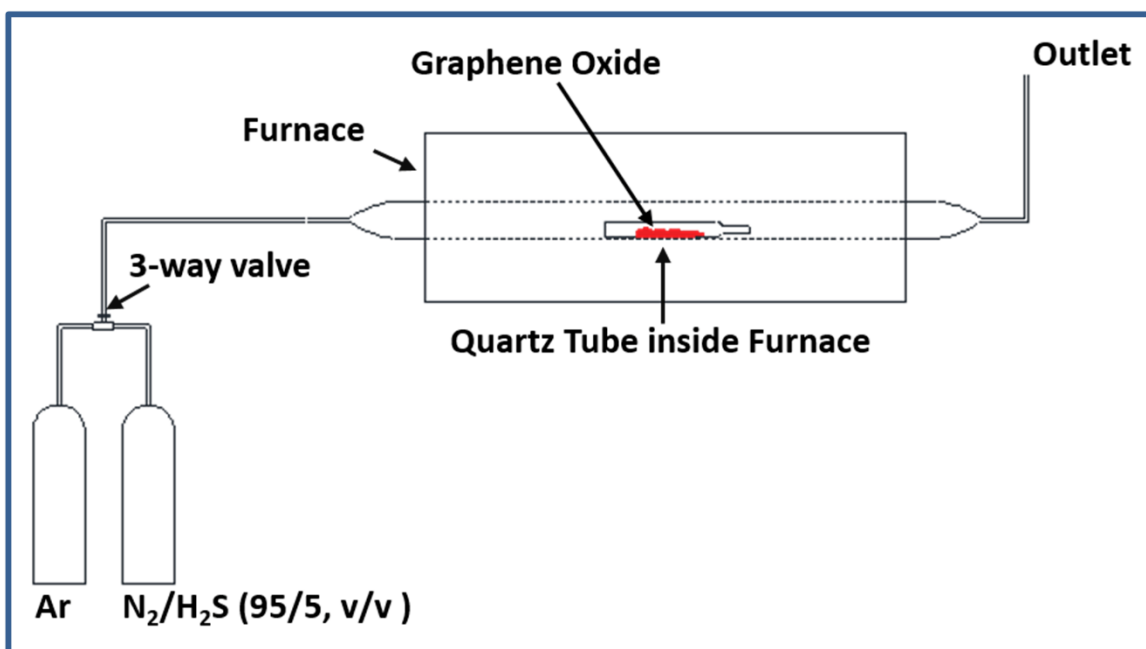


Fig. S1 Schematic of high temperature furnace with gas fittings

Thermal Analysis of GO:

Thermogravimetric analysis (TGA) (Q50, TA Instruments, USA) and differential scanning calorimetry (DSC, Q200, TA Instruments, USA) techniques were carried out under nitrogen gas flow at heating rate of 10 °C min⁻¹. TGA thermogram in Fig.S2 (a) shows sudden weight loss around 200 °C owing to removal of labile oxygen containing functional groups. DSC thermogram in Fig. S2b depicts a strong exothermic peak around 200 °C; it is at this temperature

that the process needs to be carefully monitored while performing thermal reduction of GO to avoid any safety hazards.

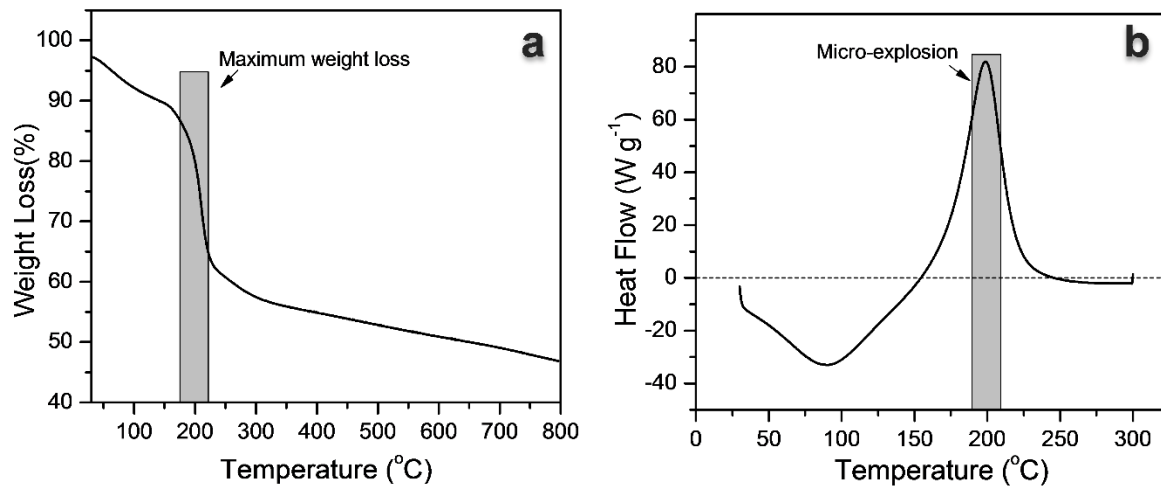


Fig. S 2 (a) TGA and (b) DSC thermograms of GO