**Supporting Information**

**Facile fabrication of ultrathin graphene papers for effective electromagnetic shielding**

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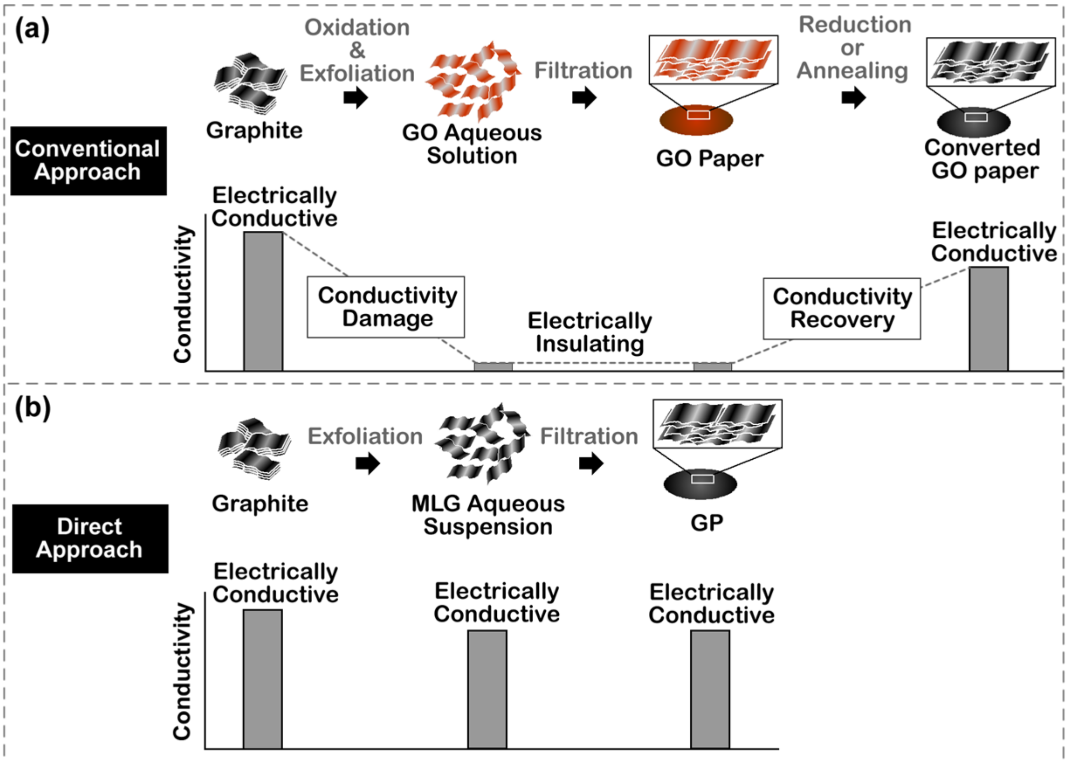


**Figure S1** schematics of conventional approach for achieving chemical converted or thermal annealed graphene-oxide papers (a) and direct approach for achieving GPs in this work (b).

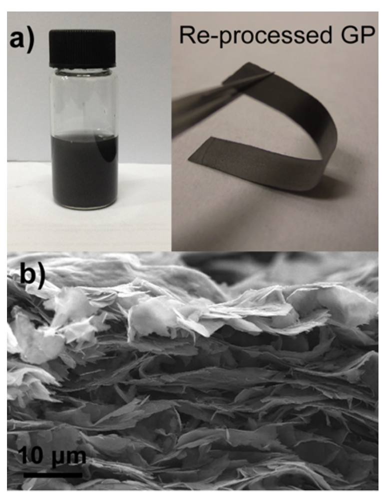


**Figure S2** Re-dispersed aqueous MLG suspension and resulting re-processed GPs (a); SEM image of the re-processed GPs (b).

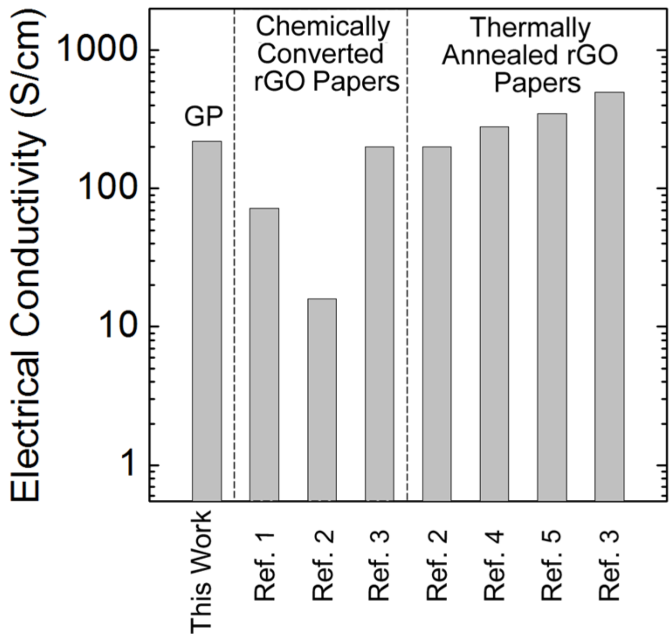


**Figure S3** Electrical conductivity of the typical graphene oxide-based papers achieved by chemical conversion and thermal annealing.

**Table S1** XPS analysis of C%, N%, O%, C/O ratio and C/N ratio in the GP and graphite sample. The presence of N element should be associated with nitric acid used in the exfoliation process.

| Sample | C (at.%) | N (at.%) | O (at.%) | C/O | C/N |
|---|---|---|---|---|---|
| GP | 90.36 | 0.93 | 8.71 | 10.37 | 97.16 |
| Graphite | 96.95 | - | 3.05 | 31.79 | - |

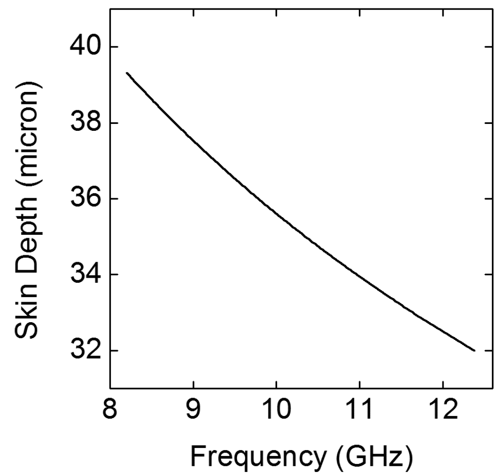


**Figure S4** Estimated skin depth versus frequency for the GPs with average electrical conductivity ~200 S/cm.

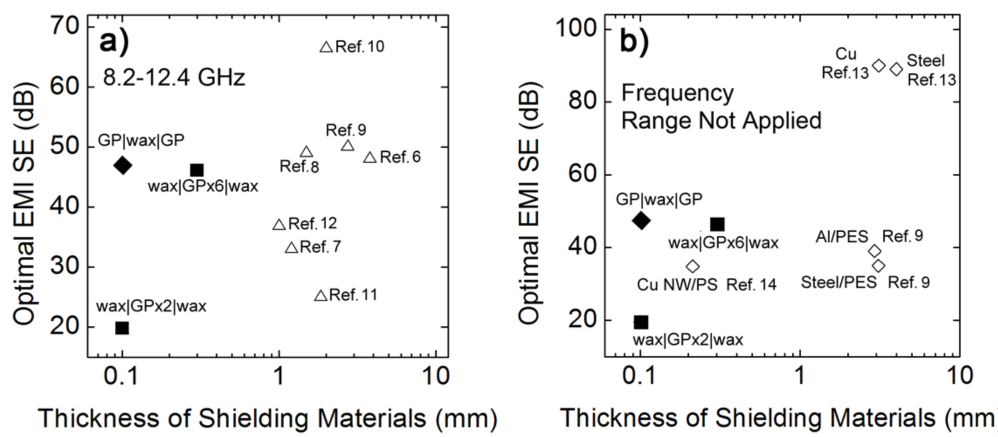


**Figure S5** Optimal EMI SE performance with shielding thickness in carbon nanotube- and carbon fiber-based shielding materials (a) and other metal-based shielding materials (b).

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