

## Supplementary Information

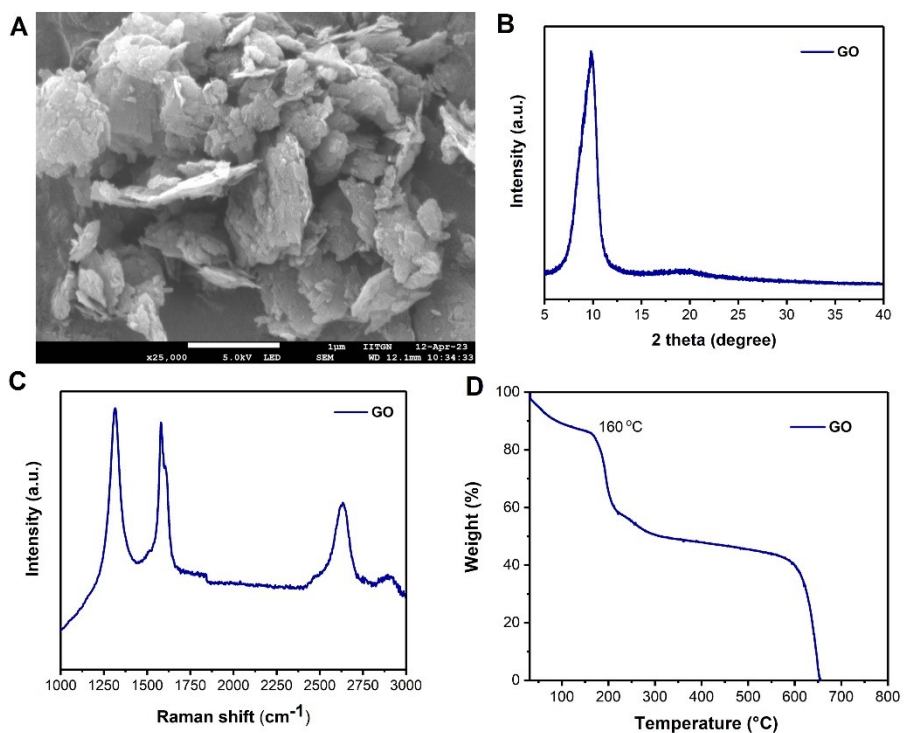


Figure S1: A) SEM image (B) XRD (C) Raman spectra and (D) TGA analysis of graphene oxide

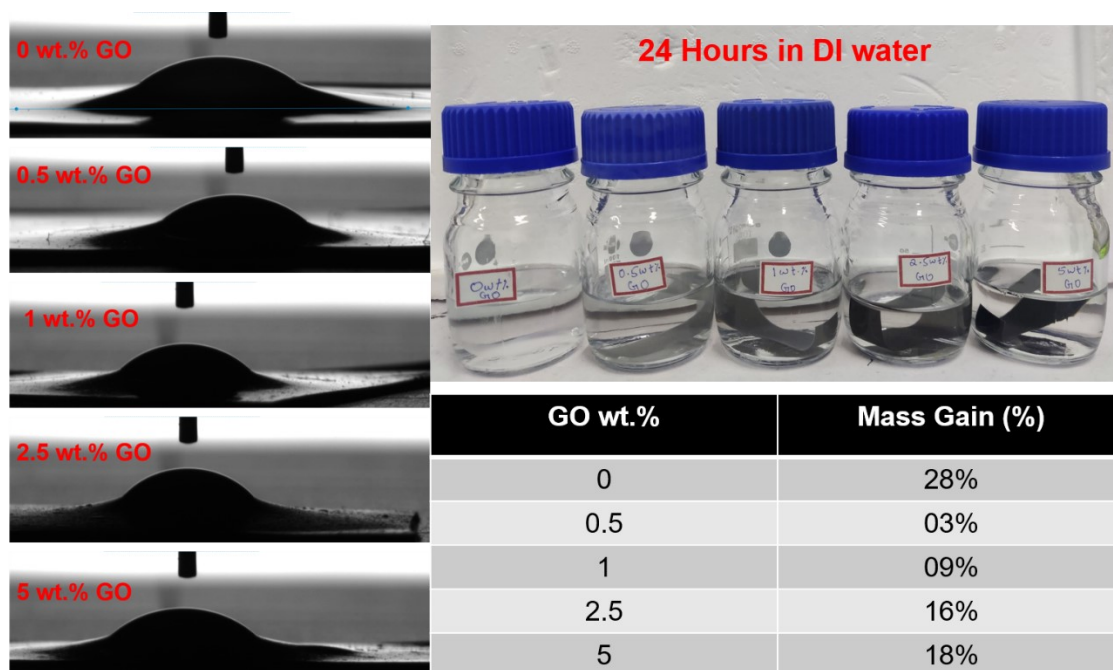
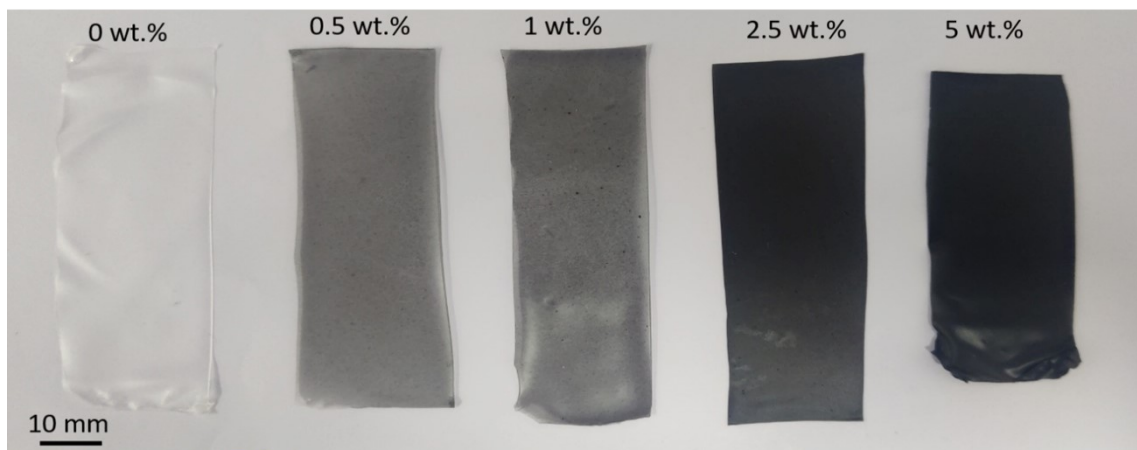
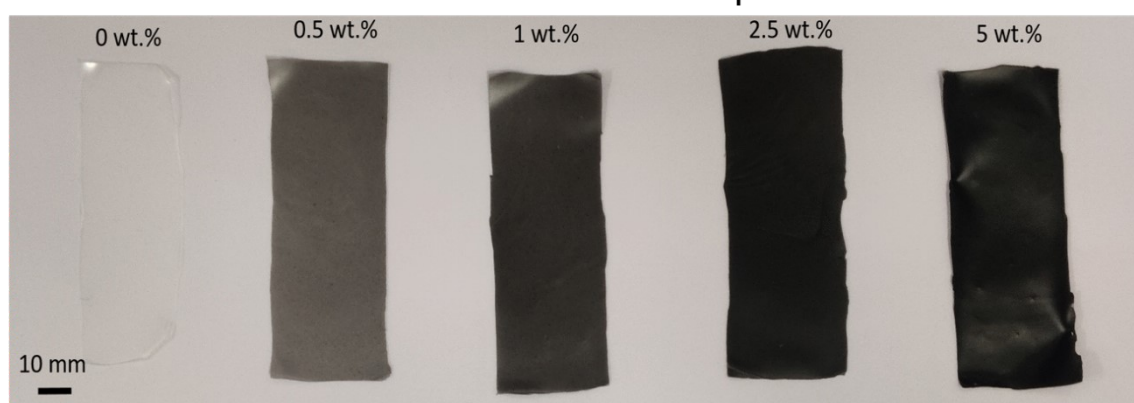


Figure S2: Contact angle measurement and water stability test



Thickness: 100-120  $\mu\text{m}$



Thickness: 200-250  $\mu\text{m}$

Figure S3: Varying thickness of RS-GO composites

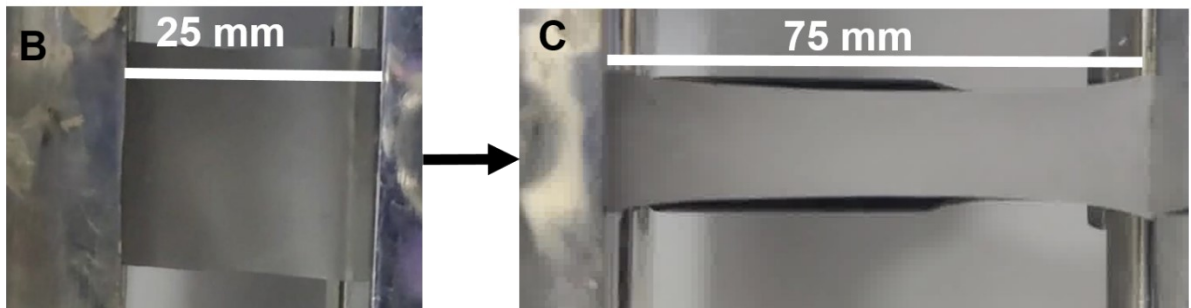
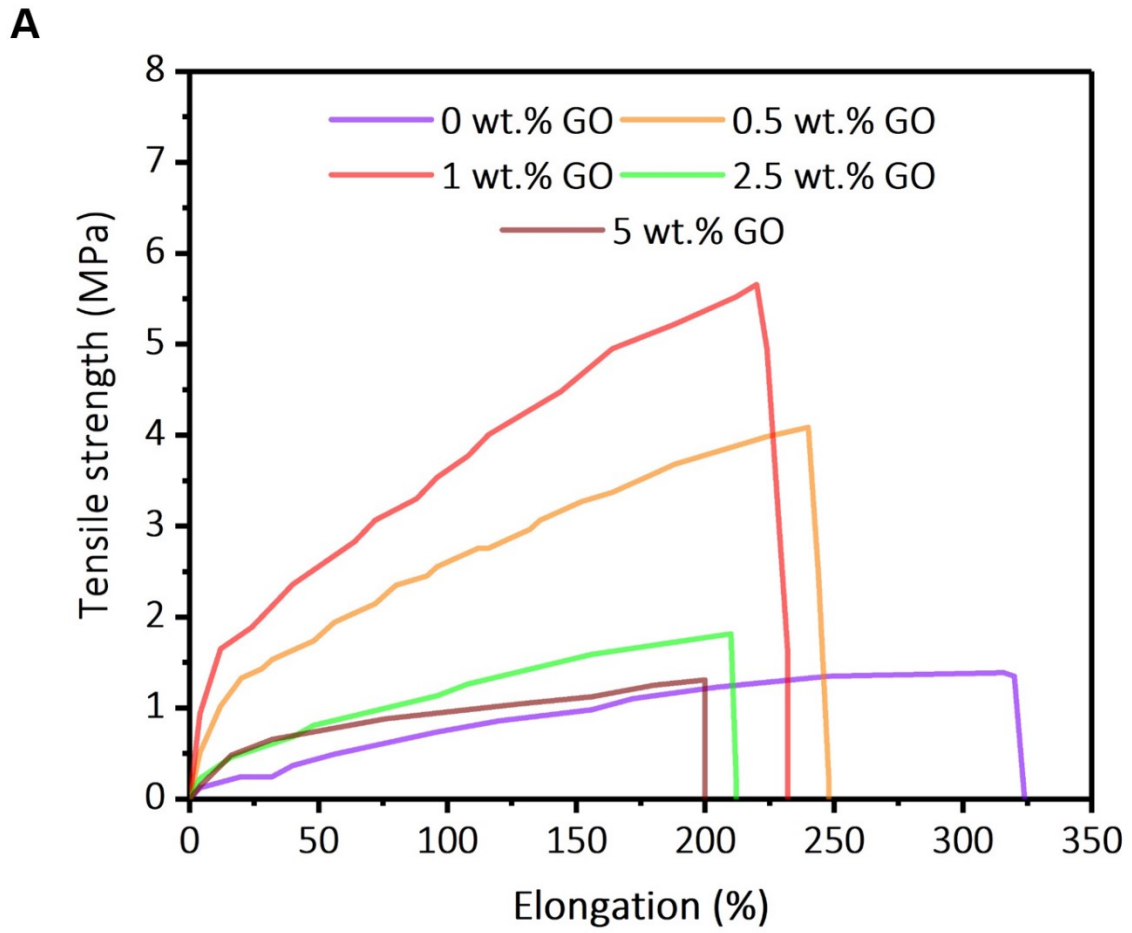


Figure S4: (A) Stress vs strain curves of RS-GO composite (B) and (C) Showing flexibility of RS-GO composite

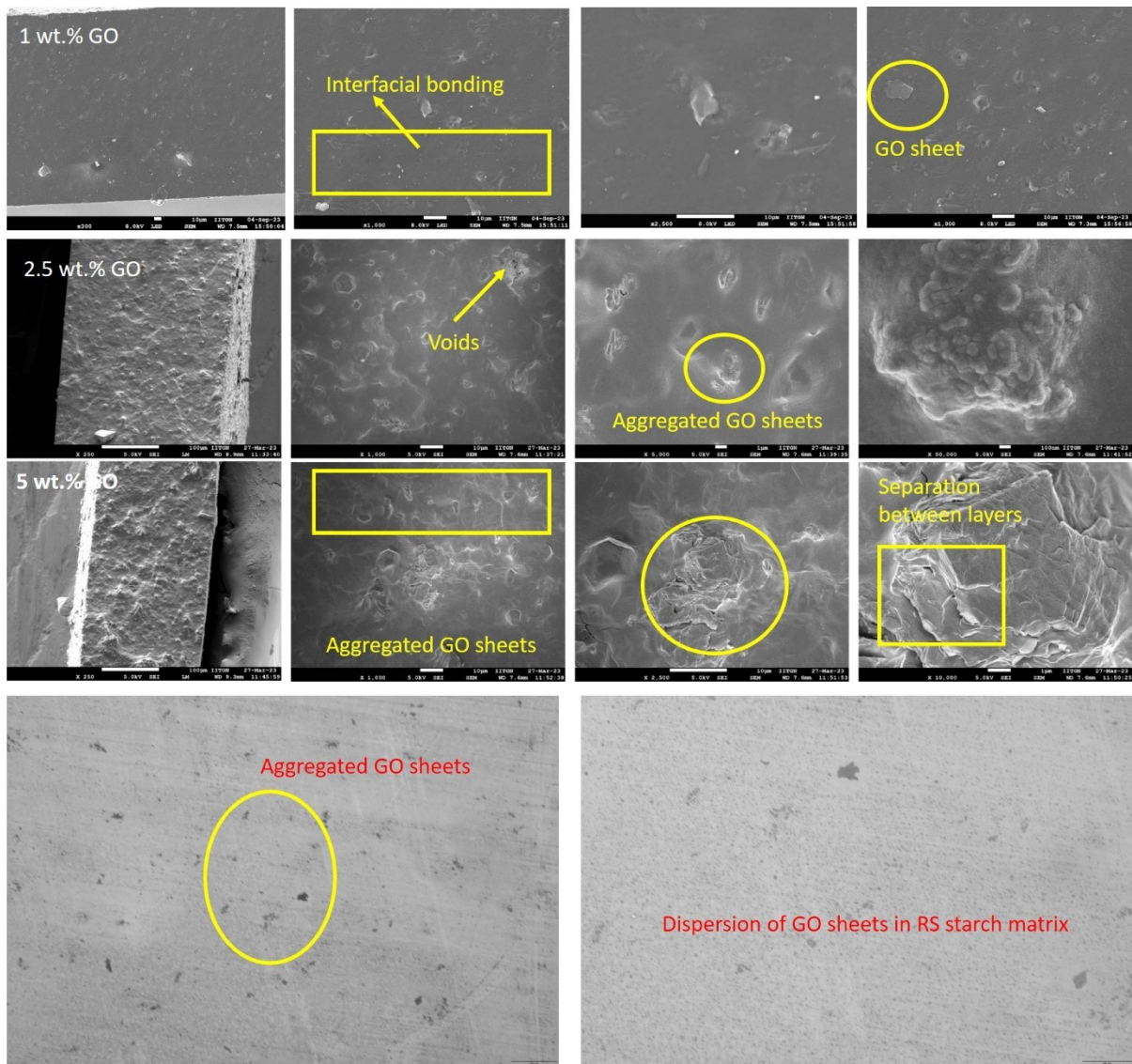


Figure S5: Cross sectional images showing dispersion of GO into RS matrix with 1, 2.5 and 5 wt. % GO, optical images of drop casted sample of 5 wt.% GO film.

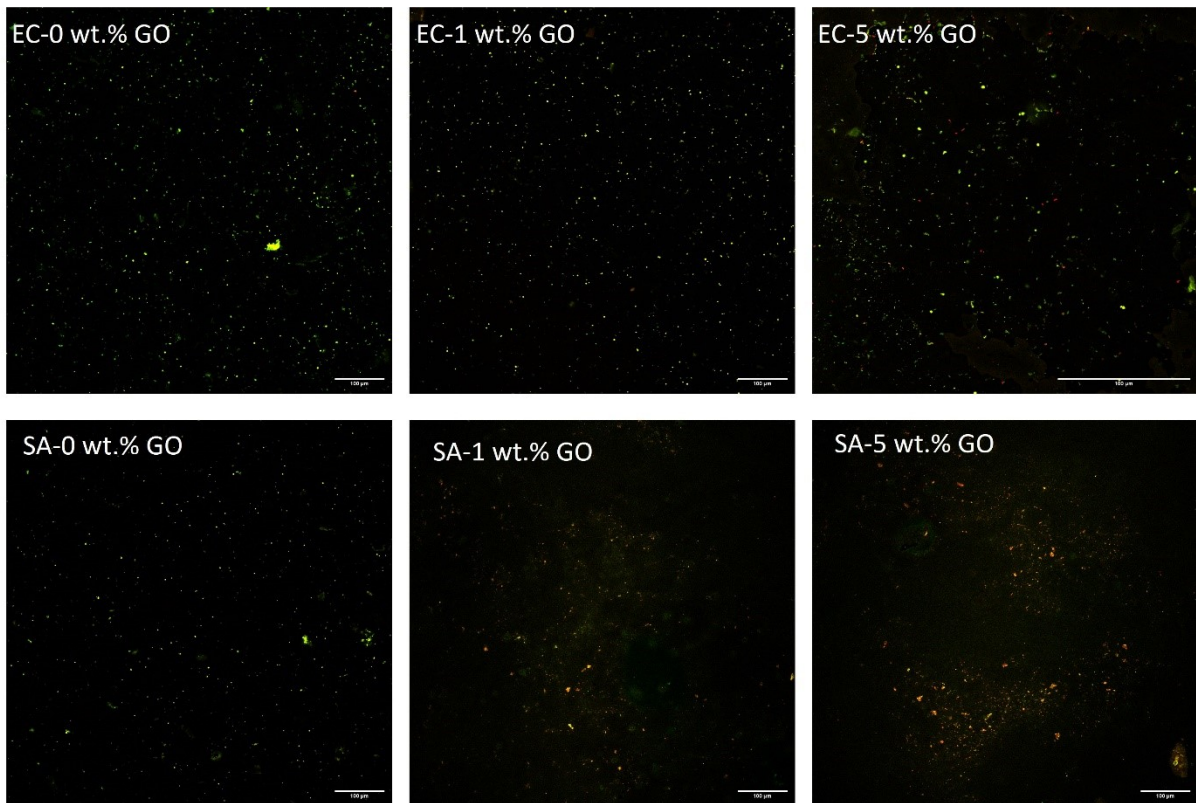


Figure S6: Confocal laser scanning microscopy (CLSM) images of live and dead bacterial staining of *E. coli* and *S. aureus* on the surface of composite films after 6hrs of incubation period.

Fig. S6 shows live/dead bacterial imaging of the composite surface using Confocal laser scanning microscopy. The findings aligned with those of the results obtained using CFU method (Fig. 6), demonstrating that RS-GO composites were more effective in killing *S. aureus* bacteria than *E. coli*.

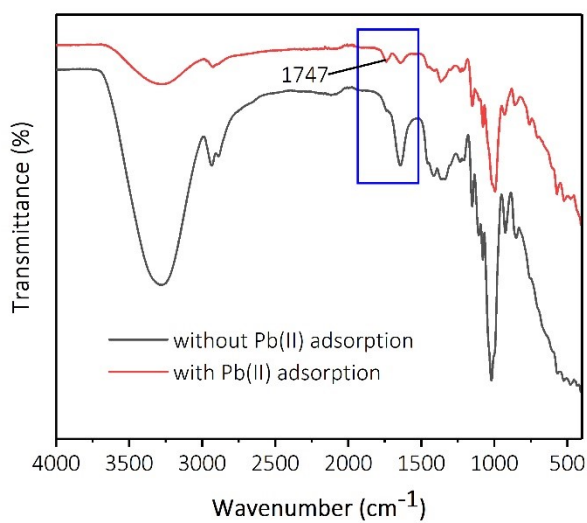


Figure S7: FTIR analysis of RS-GO composite before and after the lead Pb(II) adsorption.