Electronic Supplementary Material (ESI) for Journal of Materials Chemistry B.

Liposome-induced exfoliation of graphite to few-layer graphene dispersion with antibacterial activity

R. Zappacosta,[a] M. Di Giulio,[a] V. Ettorre,[a] D. Bosco,[b] C. Hadad,[c] G. Siani,[a] S. Di Bartolomeo,[a] A. Cataldi,[a] L. Cellini[a,*] and A. Fontana[a,*]

Electronic Supplementary Information

1. Stability Measurements

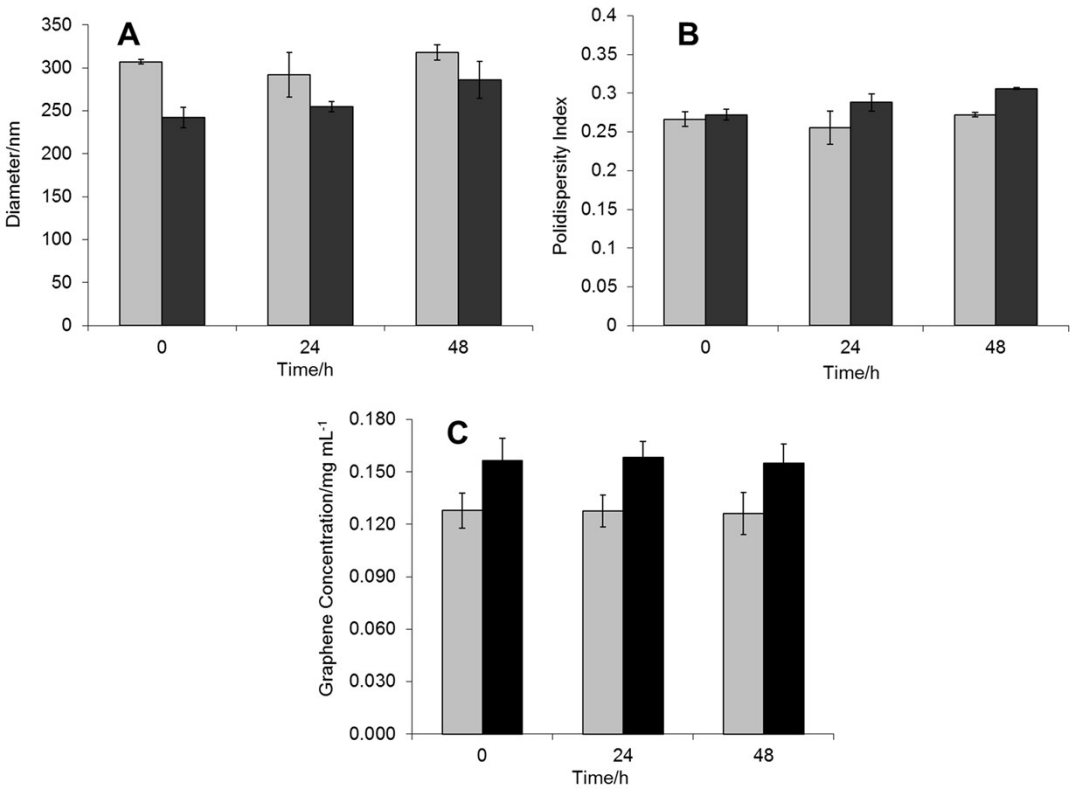
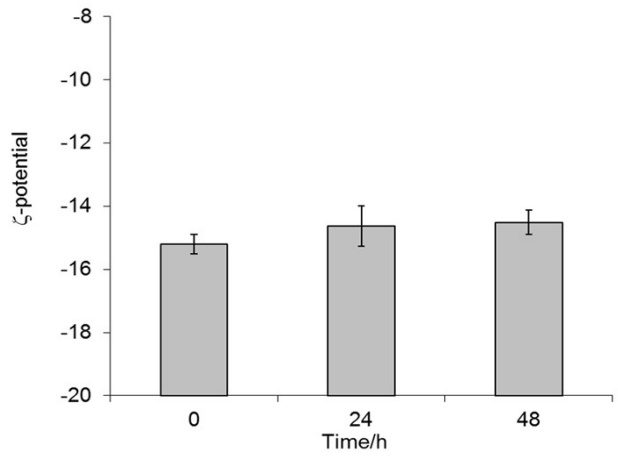
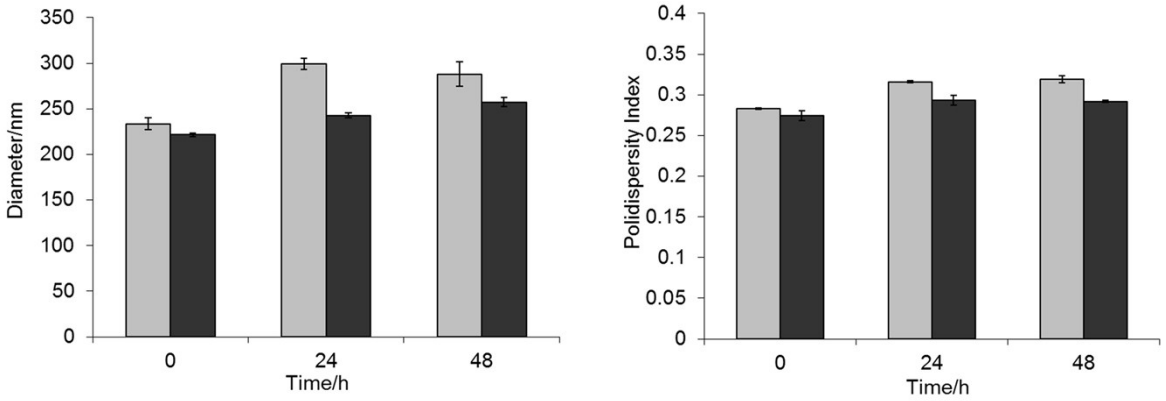


Figure S1. Stability measurements for graphene-loaded liposome prepared in water (grey) or in PBS (black) over 48 h: (A) Dimensional variation expressed as mean diameter (intensity); (B) homogeneity of the suspension expressed as polydispersity index;[S1] (C) changes of graphene concentration.



FigureS2. Variation over time of the ζ-potential of graphene-loaded liposomes prepared in water.



FigureS3. Stability measurements for graphene-loaded liposome in PBS as obtained after preparation (grey) and after 10-fold dilution (black): (A) dimensional variation expressed as mean diameter (intensity); (B) homogeneity of the suspension expressed as polydispersity index.[S1]

2. **Raman Fitting**

In order to evaluate the degree of exfoliation of graphene, the 2D band at ~2700 cm^{-1} was fitted as previously reported.[S2-S4]

The fitting obtained from 2 different experiments and 6-8 different spots for each sample are reported below.

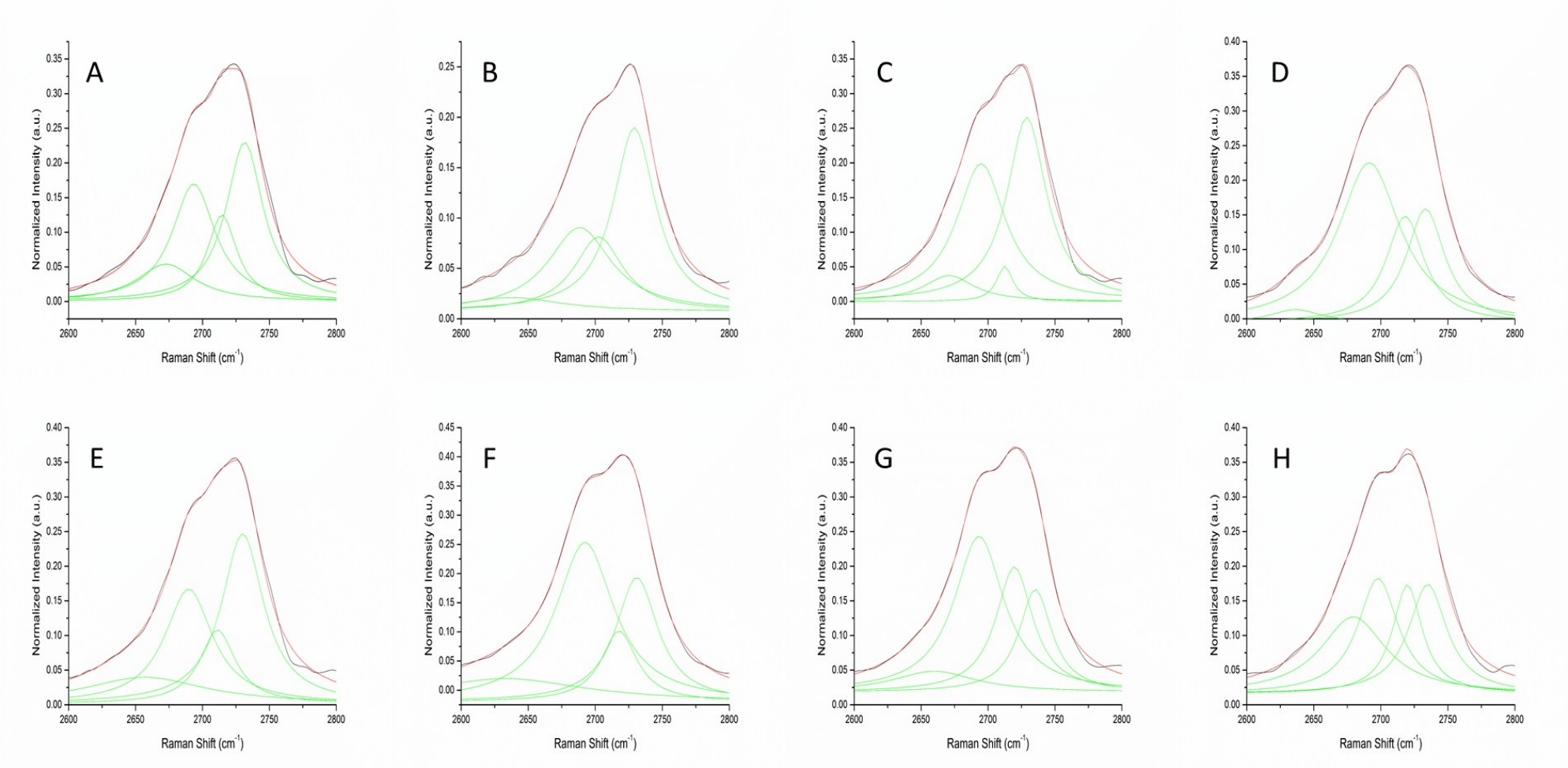


Figure S4. Fitting of the 2D band obtained from 8 different spots (A-H).

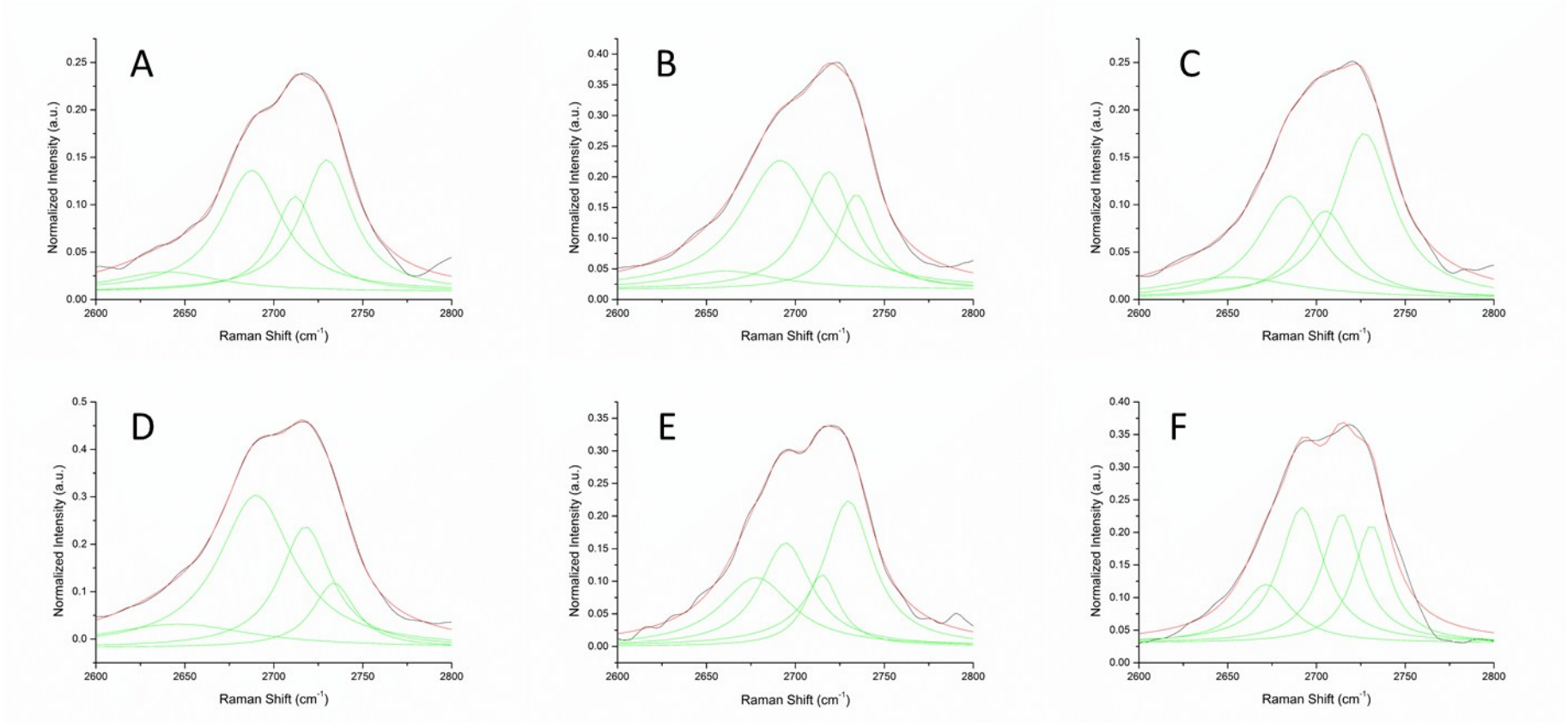


Figure S5. Fitting of the 2D band obtained from 6 different spots (A-F).

3. Precipitation of graphene embedded into liposomes

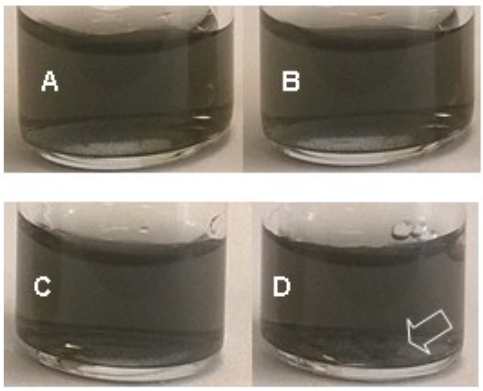


Figure S6. A) and C) Lipo-G in milli-Q water. B) Lipo-G aqueous suspensions upon addition of 10 µL milli-Q water and D) Lipo-G aqueous suspensions upon addition of 10 µL of aqueous Triton X-100 ($[\text{Triton X-100}]_{final}$ = 3.5 mM). The white arrow indicates the formation of black precipitate.

4. Gram staining images

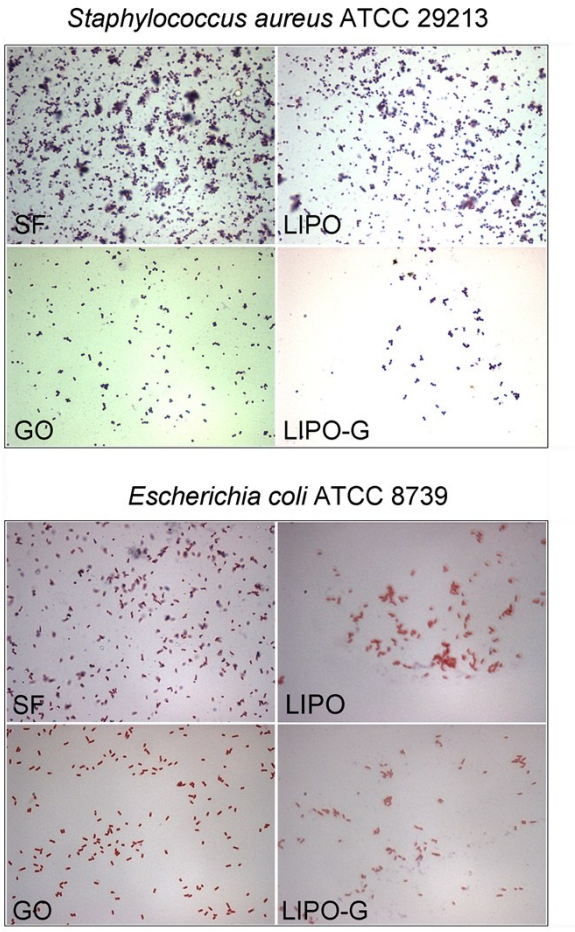


Figure S7. Representative Gram staining images of *Staphylococcus aureus* ATCC 29231 and *Escherichia coli* ATCC8739 grown for 2 h in the presence of GO and LIPO-G compared to the controls (SF and LIPO). The absence of a significant bacterial aggregation and a reduction in the total number of bacterial cells are clearly displayed in GO and LIPO-G treated samples. Images from optical microscope at 1000×.

References

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S2. A. C. Ferrari, J. C. Meyer, V. Scardaci, C. Casiraghi, M. Lazzeri, F. Mauri, S. Piscanec, D. Jiang, K. S. Novoselov, S. Roth, A. K. Geim, *Phys. Rev. Lett.*, 2006, **97**, 187401.

S3. A. C: Ferrari, D. M. Basko, *Nat. Nanotechnol*., 2013, **8**, 235.

S4. I. Calizo, D. Teweldebrhan, W. Bao, F. Miao, C. N. Lau, A. A. Balandin, *J. Phys.: Conf. Ser.*, 2008, **109**, 012008.