Toxicity of a polymer-graphene oxide composite against bacterial planktonic cells, biofilms, and human cells

Isis E. Mejías Carpio,[a] Catherine M. Santos,[a] Xin Wei,[b] and Debora F. Rodrigues*[a]

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[a] *Department of Civil and Environmental Engineering. University of Houston, Houston, TX-77004, USA. Fax: 713-743-4260; Tel: 713-743-1495; E-mail: dfrigirodrigues@uh.edu*
[b] *Department of Chemistry. Texas Southern University, Houston, TX-77004, USA. Fax: 713-313-7824; Tel: 713-313-1911; E-mail: wei_xi@tsu.edu*

Supporting Information

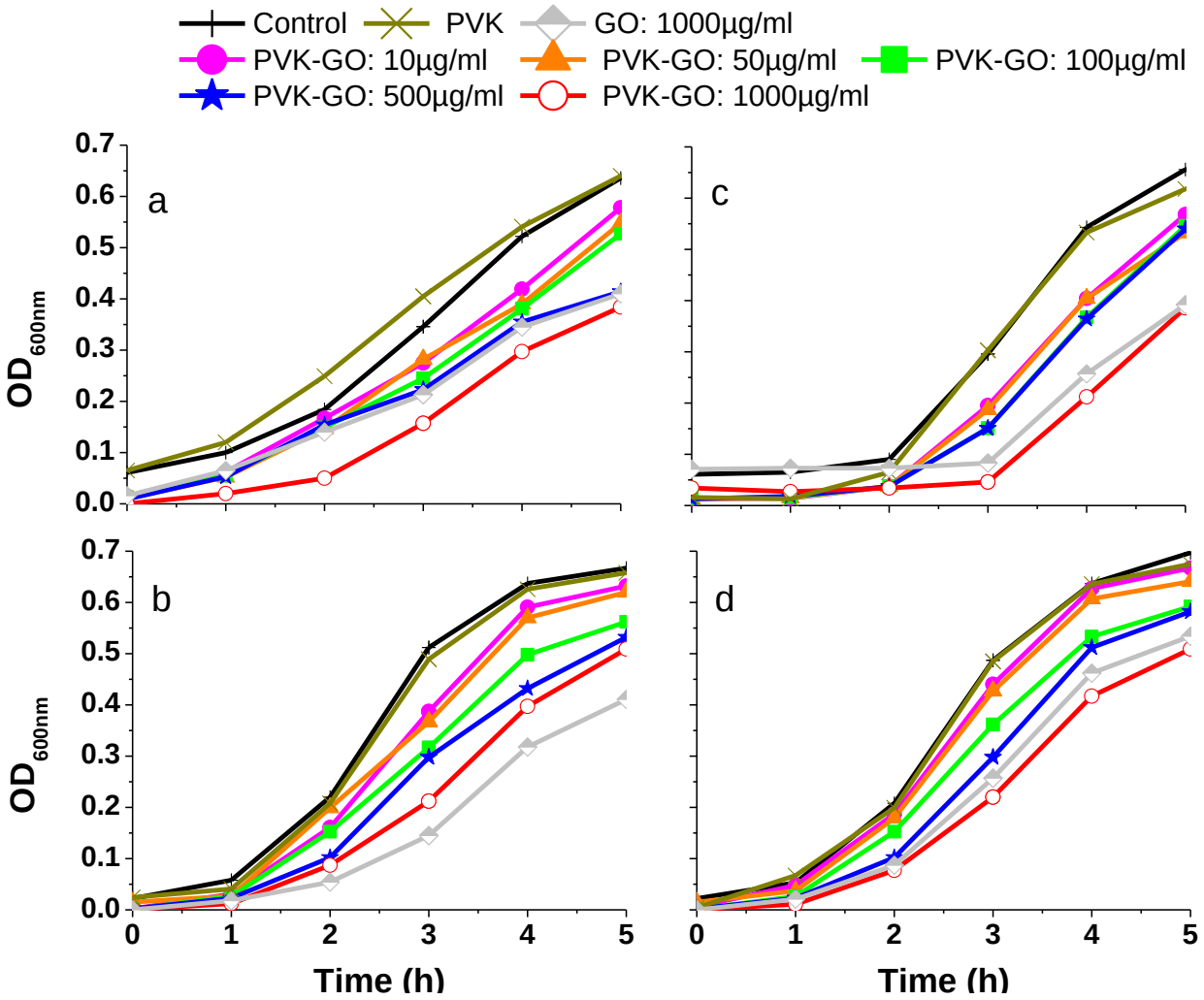

Figure S1- Bacterial growth measurements after 3h exposure to different nanomaterials. The data for each microorganism exposed to the different nanomaterials are represented in graphs: (a) *E. coli*, (b) *C. metallidurans*, (c) *B. subtilis*, and (d) *R. opacus*. Each bacterial species was treated with GO and PVK-GO in DI water at concentrations of 1000 µg mL^{-1}, 500 µg mL^{-1}, 100 µg mL^{-1}, 50 µg mL^{-1}, and 10 µg mL^{-1}. The results were derived from the optical measurements taken at OD_{600} after 1h of growth in TSB after 3h exposure to each nanomaterial.

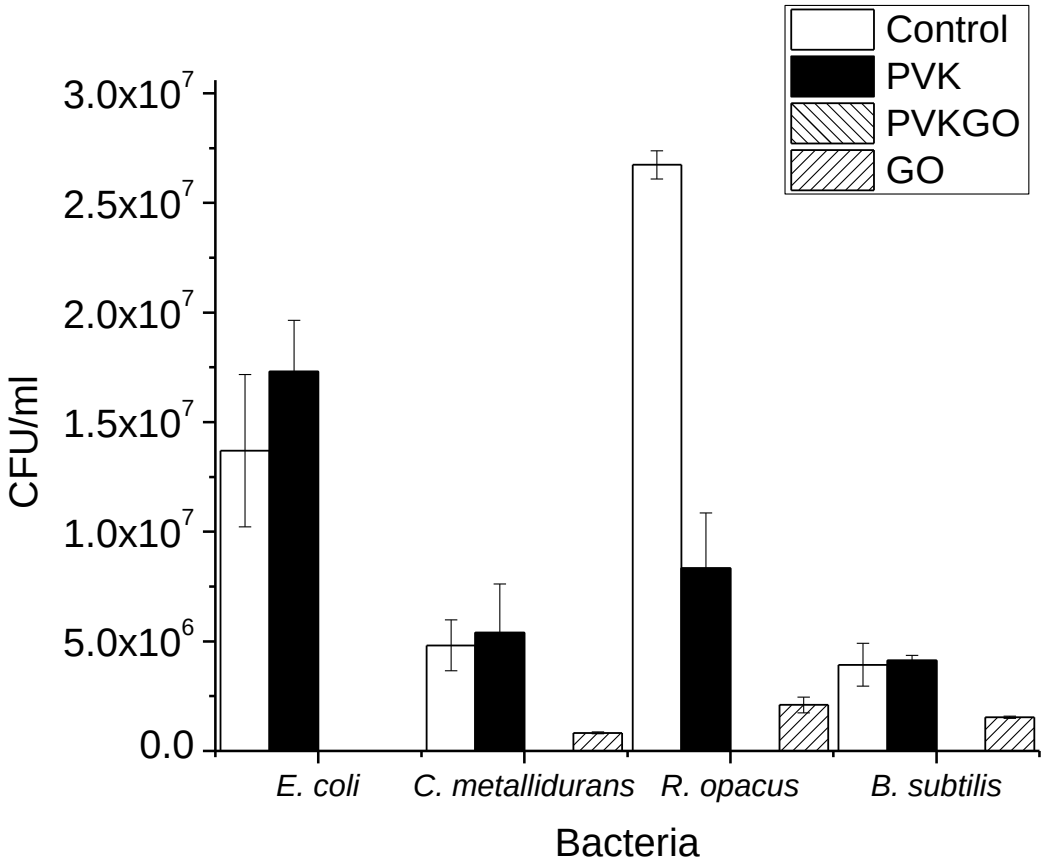

Figure S2- Plate count (CFU/mL) for *E. coli*, *C. metallidurans*, *B. subtilis*, and *R. opacus*. Each bacterial species was exposed for 3h to GO, PVK-GO, and PVK in DI water at a concentration of 1000 µg mL^{-1}. The control contained pure strains of microorganism in DI water.

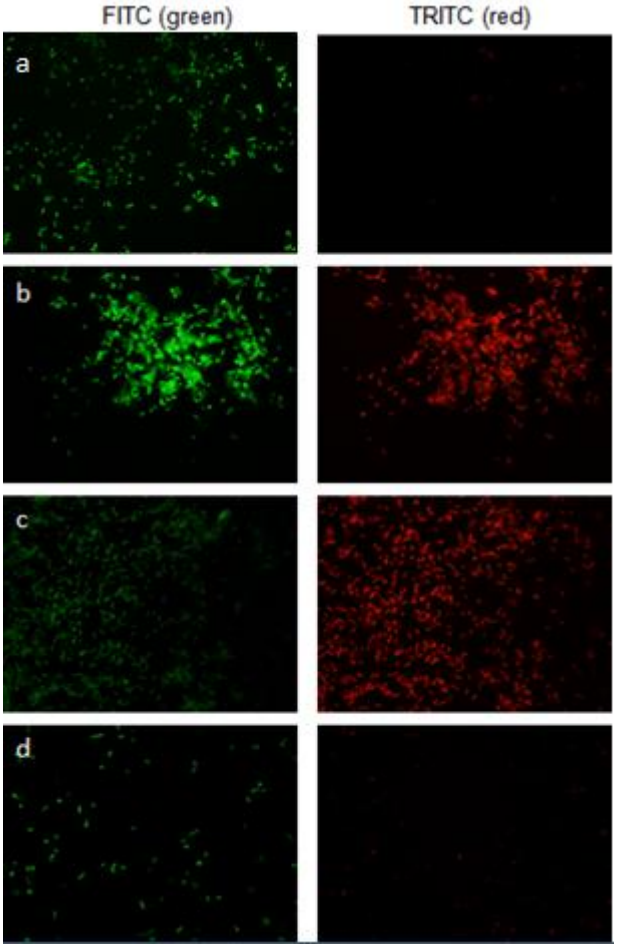

Figure S3- Representative fluorescence images of *B. subtilis* to determine the number of total number of cells and membrane-compromised cells after 1 h exposure to GO and PVK-GO. Green cells represent the total number of bacteria in the sample and red cells represent the bacteria with compromised membrane. 180µL of the bacterial suspension were mixed with 20 µL of the most toxic concentrations of nanomaterials: a) *B. subtilis* and GO (1000 µg mL^{-1}), c) *B. subtilis* and PVK-GO (1000 µg mL^{-1}), d) *B. subtilis* and PVK (1000 µg mL^{-1}).

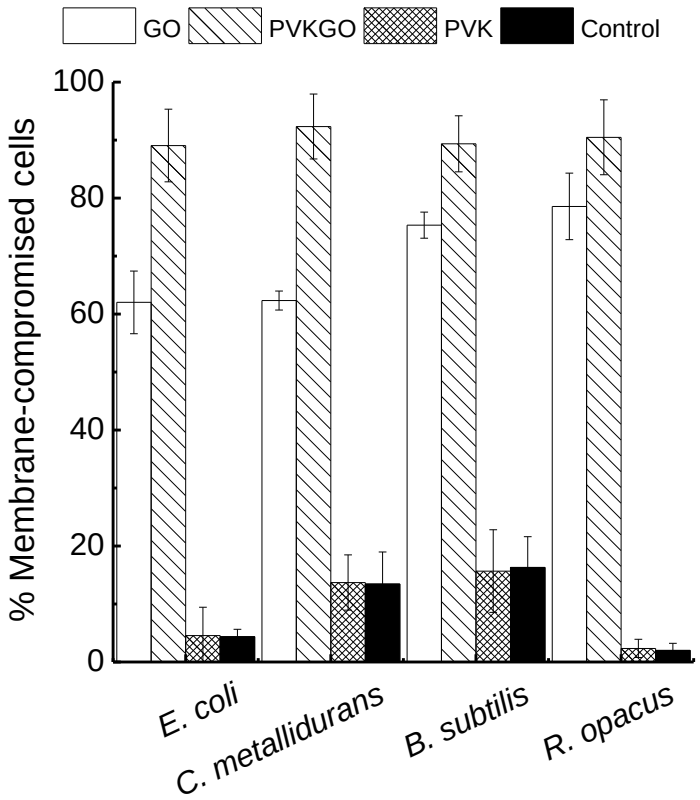

Figure S4- Percent of membrane-compromised cells after 1 h exposure to the most toxic concentrations of nanomaterials (1000 µg mL^{-1}). The bar graph was normalized by dividing the number of total cells by the number of membrane-compromised cells. The graph is a result of 18 images obtained from three replicates. Average and standard deviation values were calculated based on cell counts.

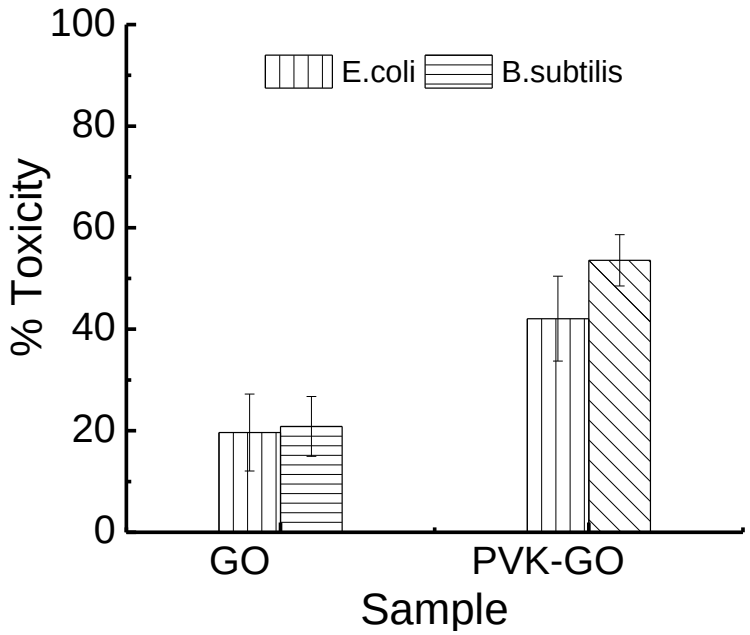

Figure S5- Percent toxicity determined from the agar plate test on the ITO-modified surfaces after 1 h exposure to the bacterial solution.

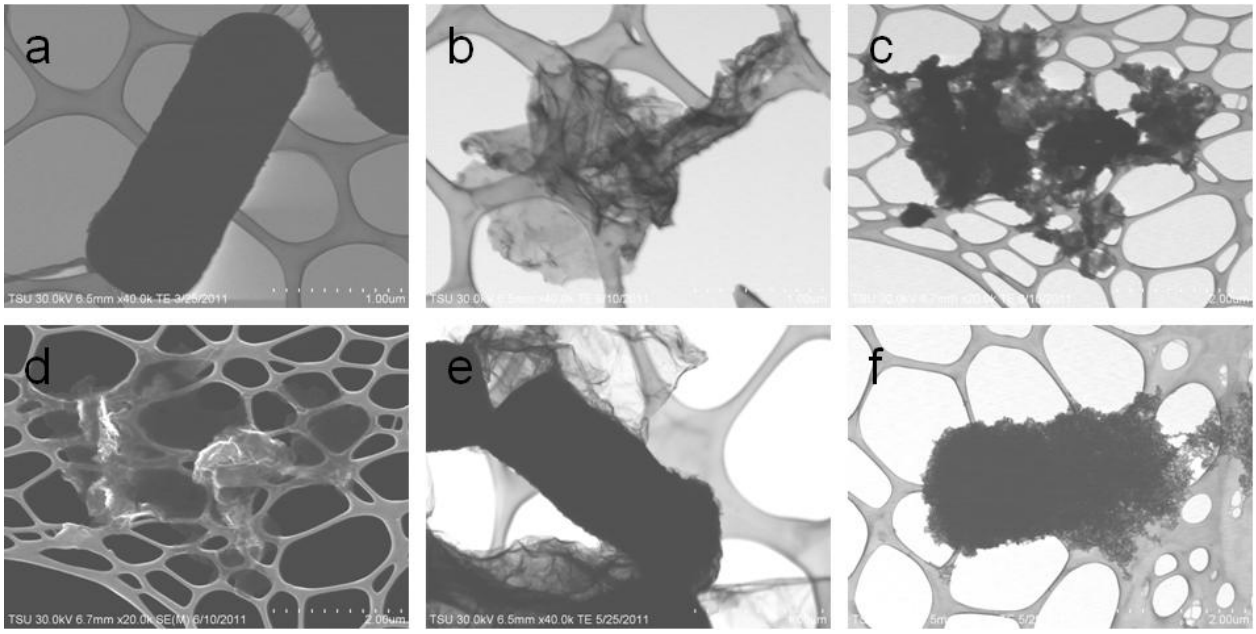

Figure S6- TEM/SEM images of the nanomaterials and *B. subtilis* after interacting with the nanomaterials GO and PVK-GO. 6a) *B. subtilis* (TEM) at 40k magnification. 6b) GO (SEM) at 40k magnification. 6c) PVK-GO (TEM) at 20k magnification. 6d) PVK-GO (SEM) at 20k magnification6e) *B. subtilis* exposed to GO at 40k magnification. 6f) *B. subtilis* exposed to PVK-GO at 20k magnification.