

Abstract Submitted
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Bacterium Wrapping with Graphene for Non-destructive TEM Imaging and Raman Enhancement NIHAR MOHANTY, Kansas State University, ASHVIN NAGARAJA, MONICA FREY, VIKAS BERRY, Kansas State University — *Graphene* - a single atom thick layer of sp^2 carbon atoms arranged in a honeycomb lattice - exhibits atomic impermeability, high electric conductivity and mesoscale flexibility. We demonstrate that graphene's functionalization with cell-adhesion-peptides makes it highly specific to bacterial cells and stable in suspensions. Upon interaction with live gram-positive bacterial cells, these graphene-peptide microcarpets (GPMCs) instantaneously (< 1 min) wrap the bacterial cells. Dye permeation studies confirm the impermeability of the GPMCs, consistent with the theory. Further, concurrent microscopic and spectroscopic analysis of the wrapping process would also be presented. Time-lapse TEM imaging studies on both wrapped and unwrapped bacteria, showed a ~ 30 % reduction in efflux of the cellular material from the wrapped bacteria. We will also present the Raman spectroscopy results, showing a ~ 400 % enhancement of the scattering signal after graphene wrapping.

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