Abstract Submitted
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Impermeable "single-monolayer" Graphenic encasement of bacteria for high vacuum Transmission electron microscopy[1] BALABALAJI PADAVALA, PHONG NGUYEN, JOSHUA PODREBARAC, JENAE TATE, VIKAS BERRY, Kansas State University — Biological cells are hygroscopic, permeable, and electron-absorbing, and imaging them *via* electron microscopes has been an important challenge due to the volumetric-shrinkage and structural degradation of cells under high vacuum and fixed electron beam. In this talk, we will show that "single-monolayer" graphenic encasement of individual whole "wet" bacterial cells can enable wet-phase TEM imaging by preserving their dimensional, topological characteristics and cellular water under high vacuum (10^{-5} Torr) and beam current (150 A/cm^2). Ultrathin and impermeable "single monolayer" graphene microsheet was wrapped around or laid on bacteria. The combination of strongly-packed honeycomb-lattice, high Young's modulus, high electrical and thermal conductivity, and mesoscale flexibility of the single graphene monolayer reduced the permeability of cells under TEM conditions, significantly abated electron beam damage and cell-delamination from substrate.

[1]KSU-Startup

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