

Abstract Submitted
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Self-Assembly of 2D TMV Arrays on Substrate-Supported and Langmuir Lipid Monolayers SUNTAO WANG, ANTONIO CHECCO, Brookhaven National Laboratory, ZHONGWEI NIU, QIAN WANG, University of South Carolina, MASAFUMI FUKUTO, LIN YANG, Brookhaven National Laboratory — Bionanoparticles (large proteins, viruses) are ideal building blocks for creating ordered two-dimensional (2D) arrays. These 2D protein crystals or ordered arrays are of great scientific and technological interest. Here, we demonstrate the use of in-situ x-ray scattering and Brewster angle microscopy (BAM) to monitor the formation of self-assembled, 2D ordered arrays by tobacco mosaic viruses (TMVs) on a lipid layer that was either supported by a solid substrate or formed at the liquid-vapor interface. The lipid monolayer not only confined the viral particles within a plane, but also provided the lateral mobility that is crucial for developing structural order. In-situ X-ray scattering was used to provide real time information on the structure of the virus array and guide optimizations of the surrounding chemical environment to improve in-plane structural order. The presence of Ca^{2+} ions is also essential to the formation of well ordered, closely packed 2D arrays of TMV. Atomic Force Microscopy was also used to directly image the final structure to provide real space confirmation of developed structural order.

Suntao Wang
Brookhaven National Laboratory

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