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Disguising Upconversion Nanoparticle Probes in a Virus Protein Cloak[1] AMBERLY XIE, Indiana Univ - Bloomington, RUBEN CADENA-NAVA, National Autonomous University of Mexico, IRINA TSVETKOVA, BOGDAN DRAGNEA, XINGCHEN YE, Indiana Univ - Bloomington — While virus capsid assembly has been extensively studied in environments mimicking *in vivo* conditions, such as with the synthesis of virus-like particles (VLPs), not much is known about virus assembly in buffers containing organic solvents. In this study, Brome Mosaic Virus (BMV) capsid proteins were assembled around both gold nanoparticles (GNP) as well as upconversion nanoparticles (UCNP), which have the unique ability to absorb low energy IR light and emit higher energy visible light. While GNPs can easily be modified to be stable in aqueous buffers, UCNPs are usually only stable in organic solvents. Because of this, assemblies were conducted in different concentrations of DMSO to try and encapsulate the UCNPs. Analysis of assemblies utilized techniques such as transmission electron microscopy, dynamic light scattering, fluorescence measurements, and circular dichroism. It was found that increasing the concentration of DMSO did not affect GNP-VLP assembly nor the BMV capsid proteins themselves. Assembly around UCNPs in buffers with DMSO ultimately proved successful, with the UCNP retaining their optical properties. Not only can these UCNP-VLP be used in medical imaging and cell targeting, but the success of assembly in non-biological conditions opens the door to studying virus assembly in a multitude of environments.

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