

Supplementary Information

Nanoscale Characterization of the Biomolecular Corona by Cryo-Electron

Microscopy, Cryo-Electron Tomography, and Image Simulation

Sara Sheibani^{1*,#}, Kaustuv Basu^{2*}, Ali Farnudi³, Aliakbar Ashkarran⁵, Muneyoshi Ichikawa¹, John F. Presley¹, Khanh Huy Bui^{1,2}, Mohammad Reza Ejtehad^{3,4,#}, Hojatollah Vali^{1,2}, and Morteza Mahmoudi^{5,#}

¹Department of Anatomy & Cell Biology, McGill University, Montreal, Quebec H3A 0C7, Canada

²Facility for Electron Microscopy Research, McGill University, Montreal, Quebec H3A 0C7, Canada

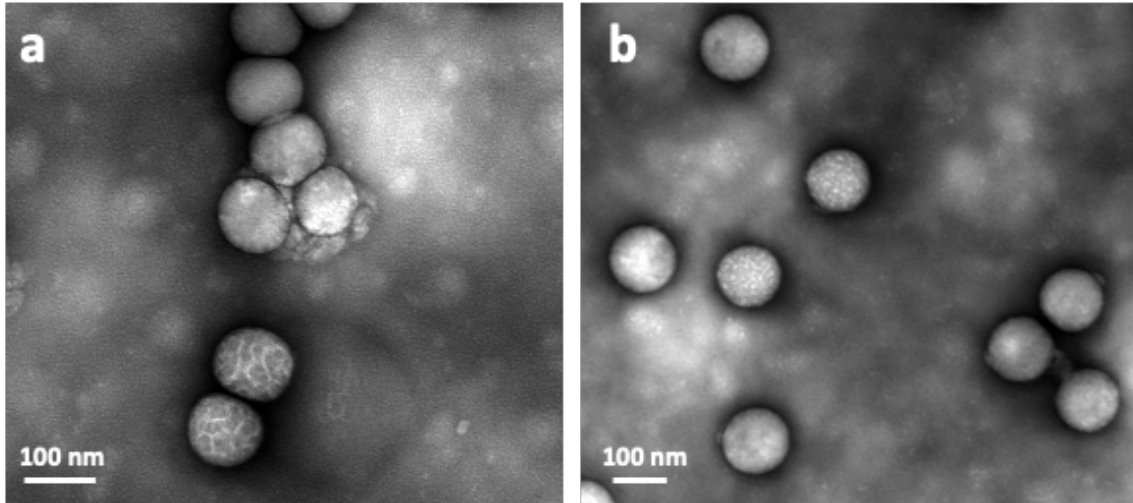
³Department of Physics, Sharif University of Technology, Tehran, Iran

⁴School of Nano Science, Institute for Research in Fundamental Sciences (IPM), Tehran, Iran

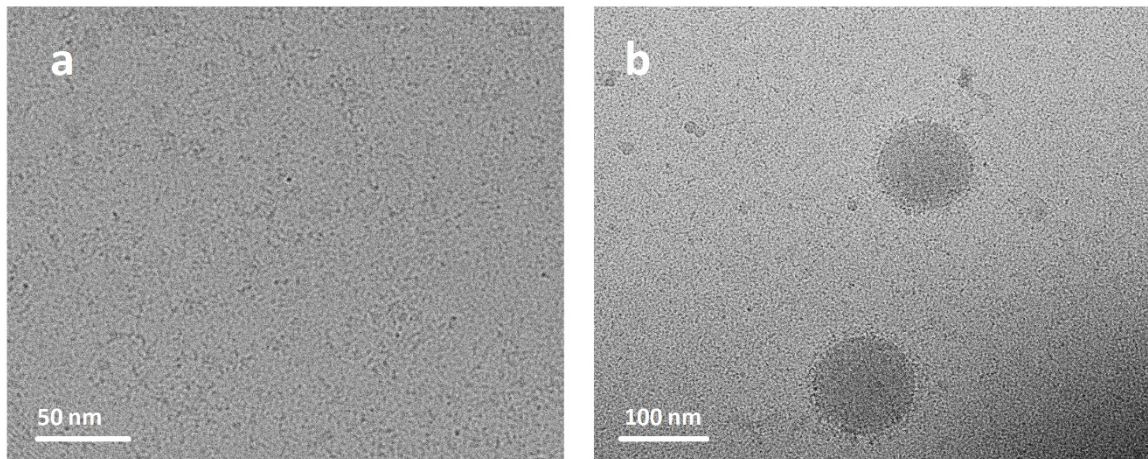
⁵Department of Radiology and Precision Health Program, College of Human Medicine, Michigan State University, East Lansing, USA

* Co-authors

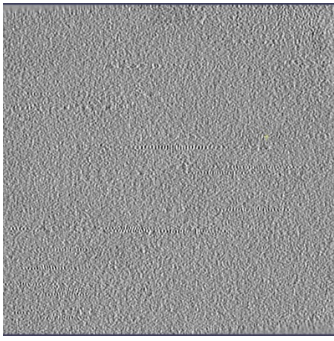
Corresponding authors: (MRE) email: ejtehad@sharif.edu; (SS) email: sara.sheibani@mcgill.ca; (MM) email: mahmou22@msu.edu



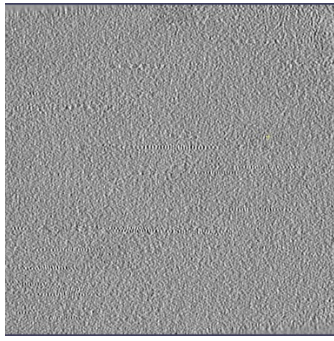
Supplementary Figure 1. (a) Protein corona (hard and soft) formation on the surface on nanoparticles (no wash) (b) hard protein corona formation on the surface of nanoparticle (with washing step).



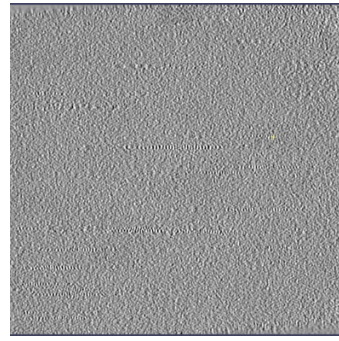
Supplementary Figure 2. Cryo-EM images of the PS-COOH NPs (a) original plasma diluted in Sorensen's phosphate buffer to 50%. There is little evidence for presence of large cluster and aggregate; (b) NPs with corona in 2% solution showing the distribution of biomolecules and their association with the surface of the NPs. Similar to the plasma, there is little evidence for large clusters.



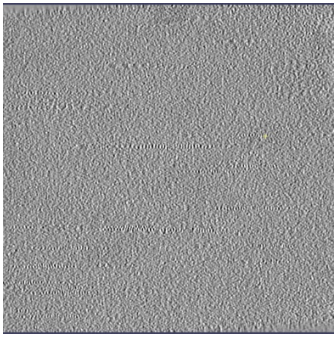
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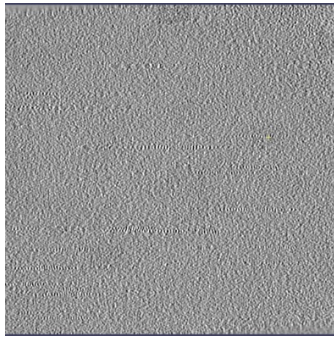
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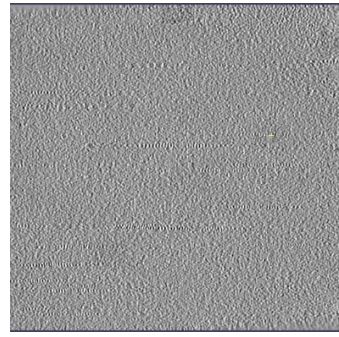
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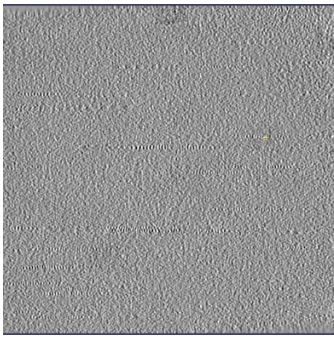
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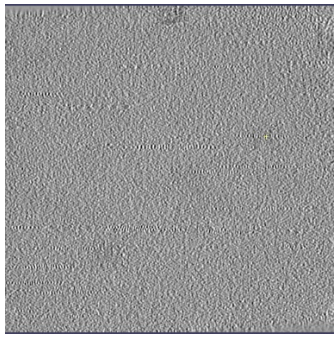
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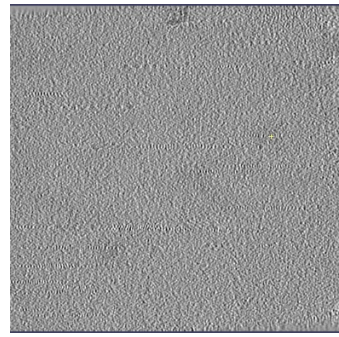
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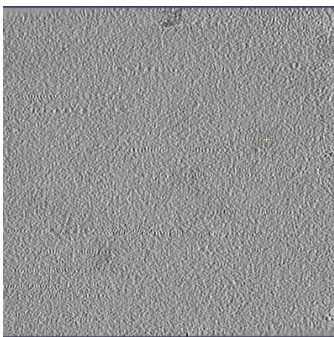
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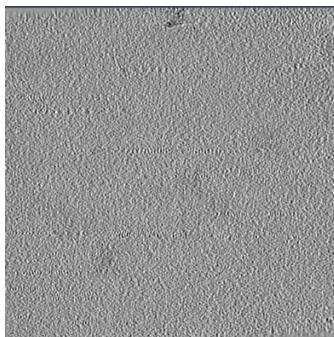
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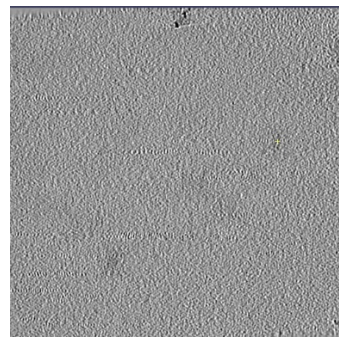
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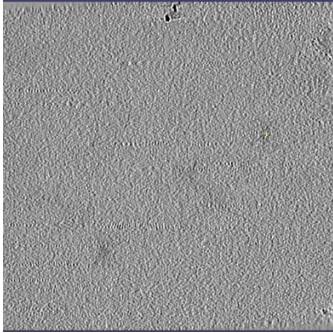
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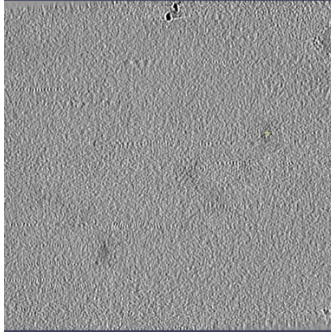
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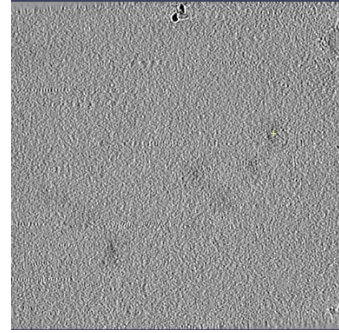
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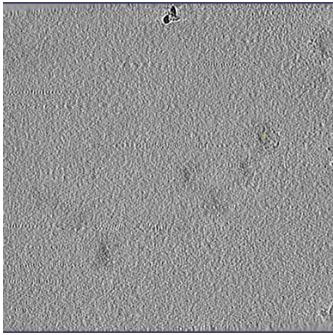
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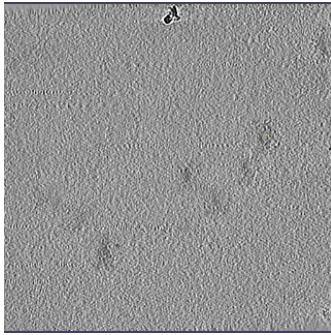
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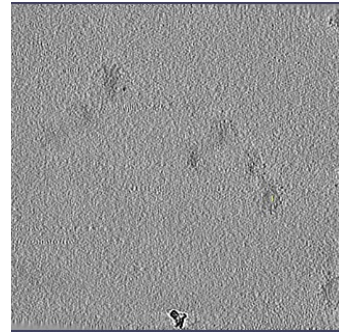
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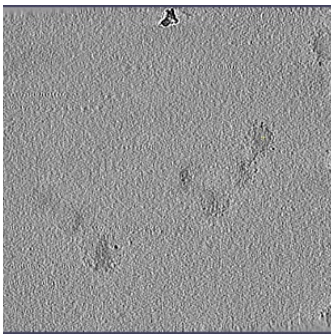
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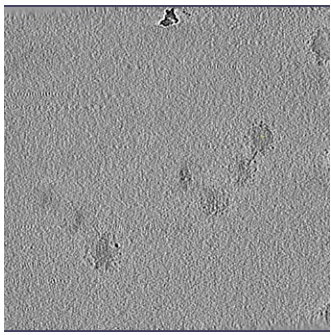
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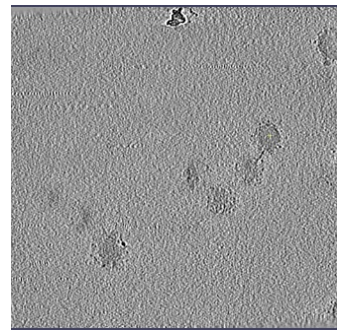
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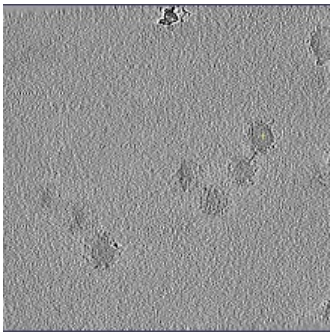
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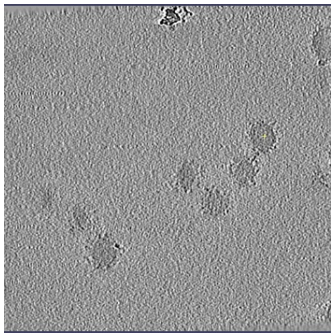
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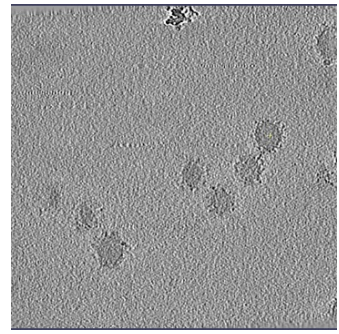
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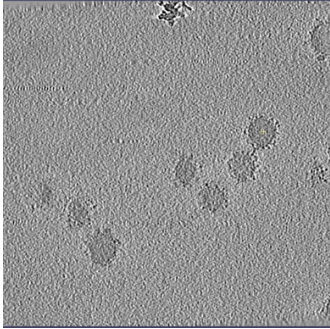
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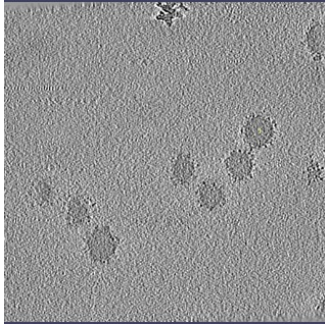
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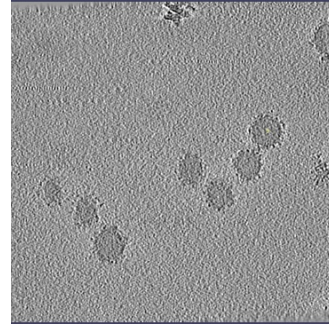
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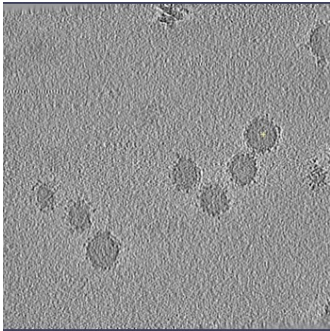
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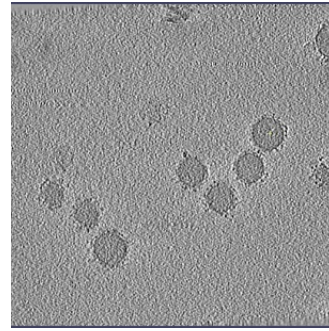
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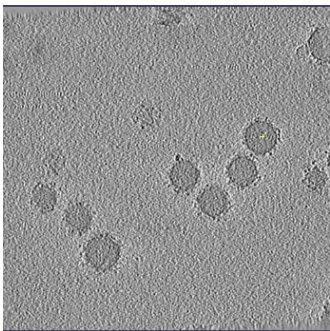
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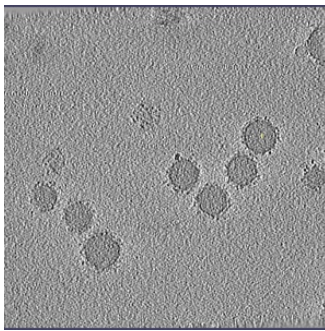
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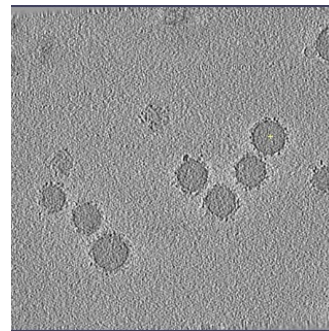
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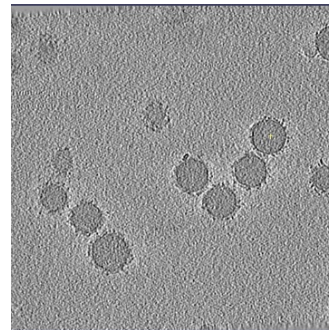
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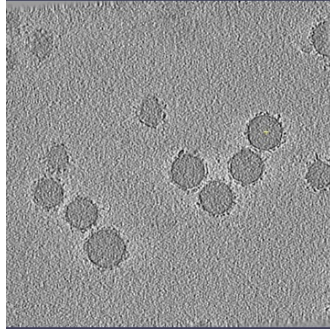
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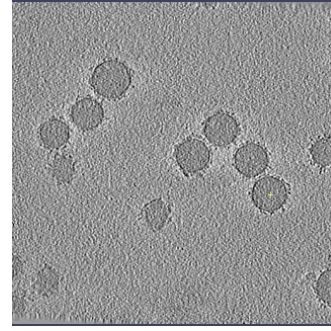
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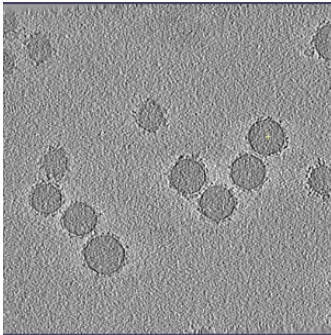
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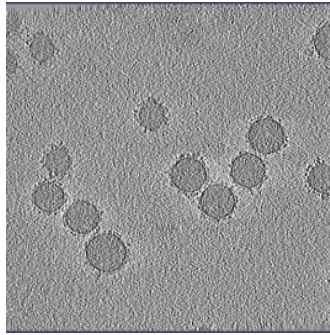
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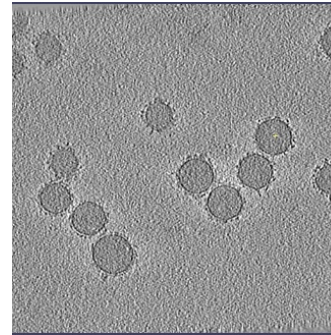
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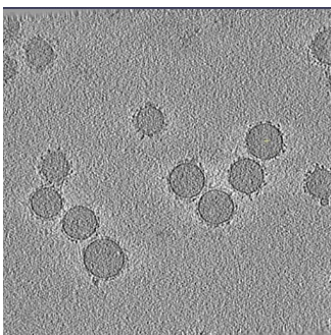
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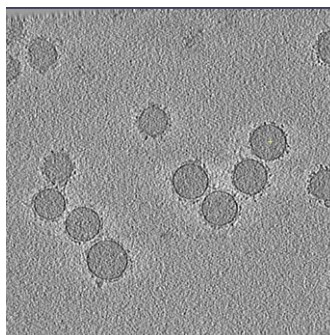
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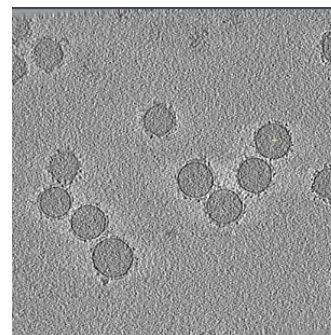
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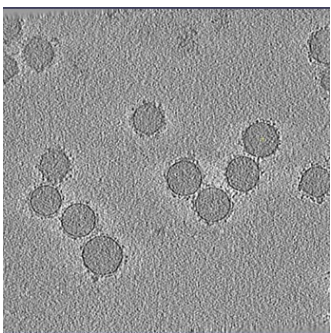
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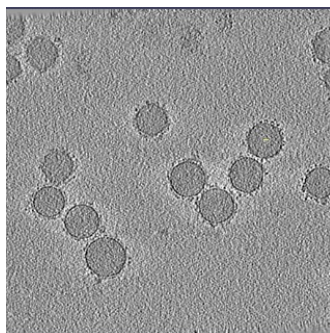
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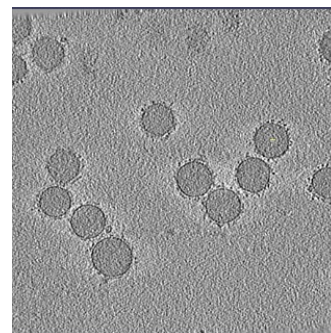
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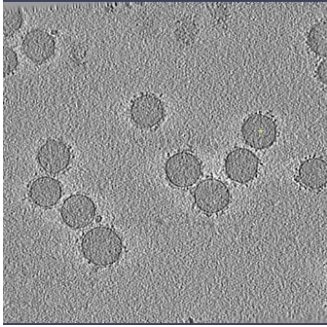
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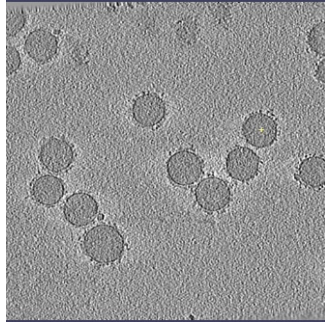
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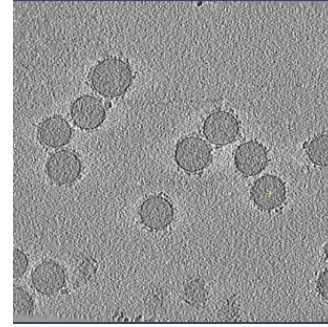
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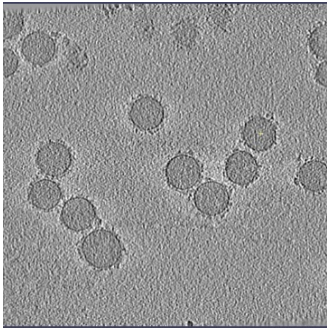
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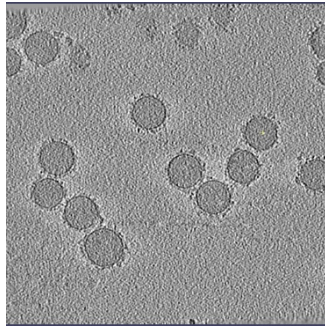
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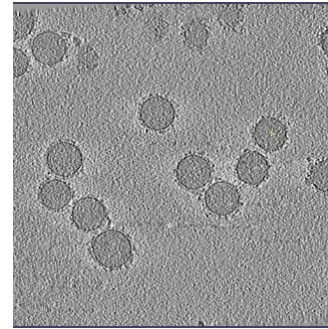
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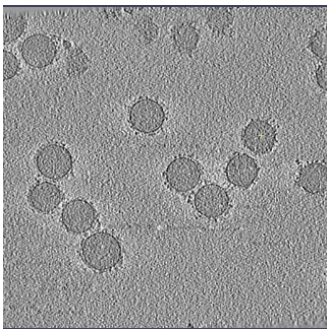
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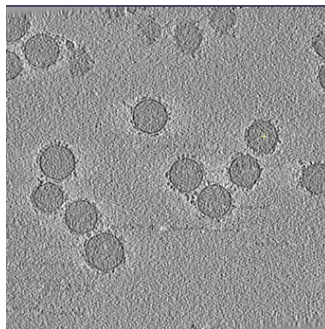
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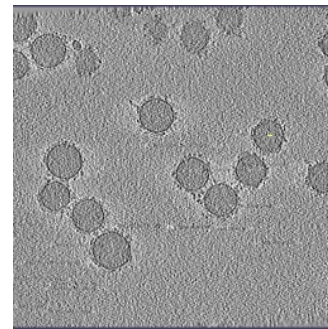
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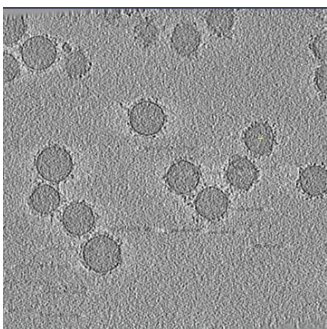
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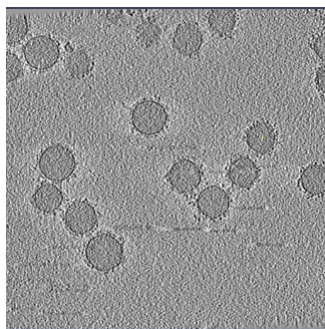
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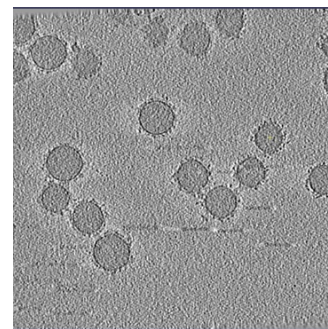
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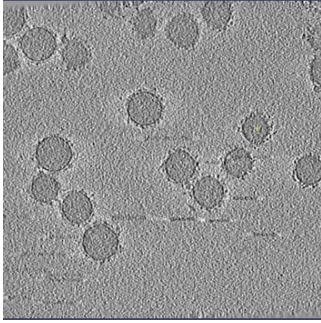
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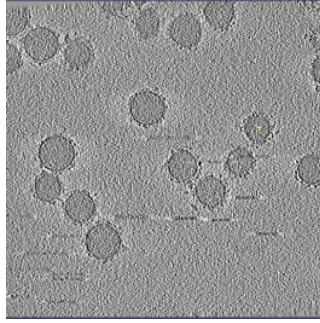
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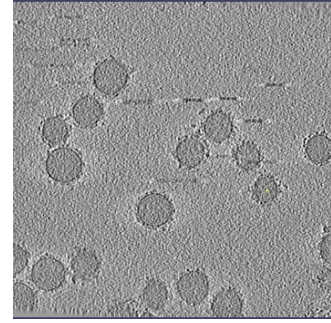
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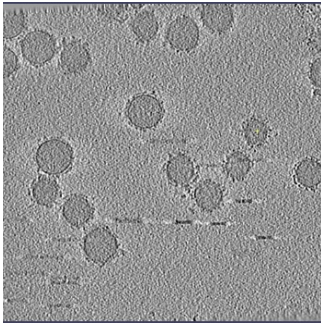
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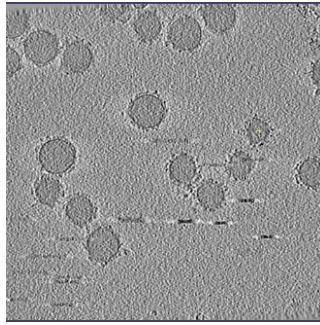
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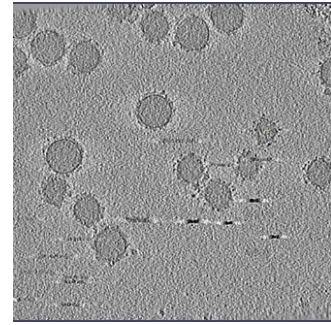
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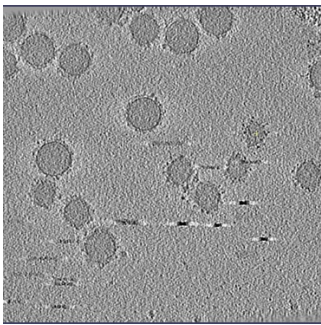
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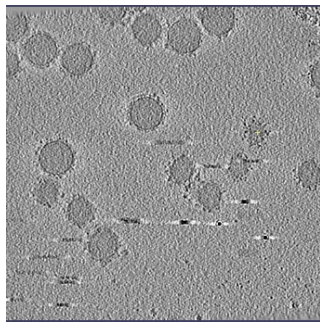
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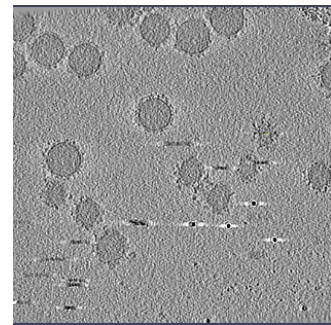
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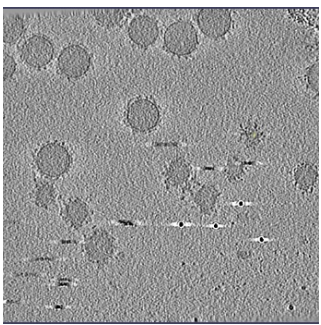
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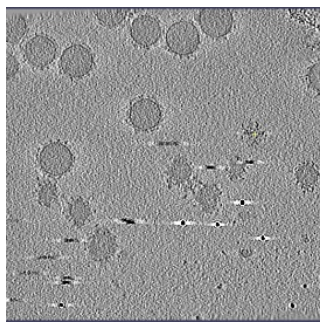
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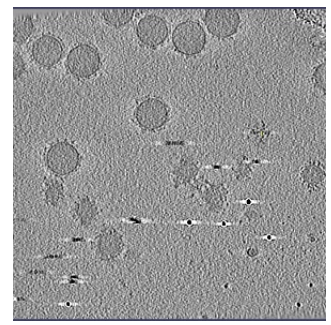
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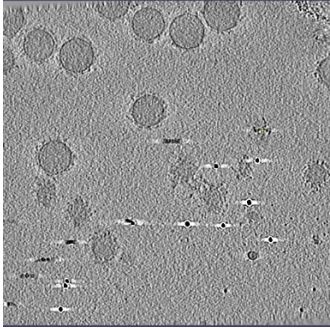
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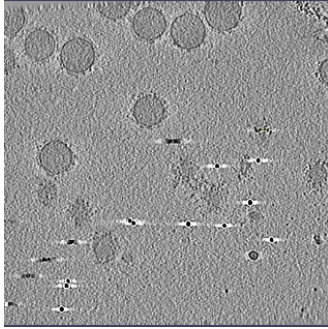
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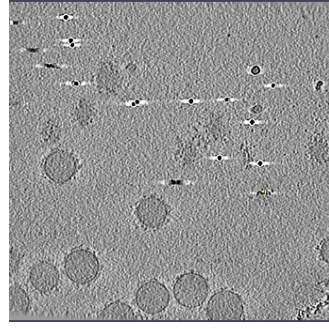
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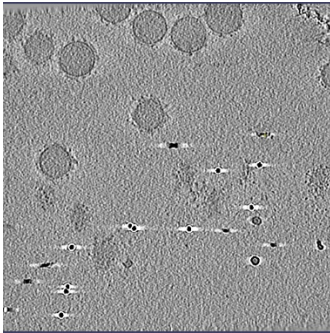
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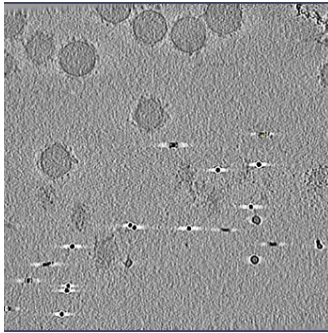
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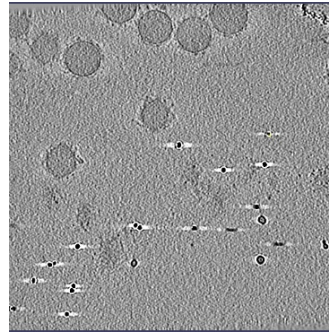
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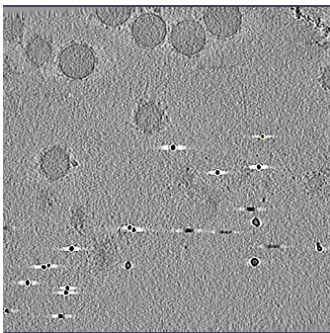
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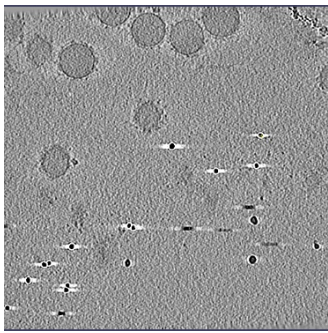
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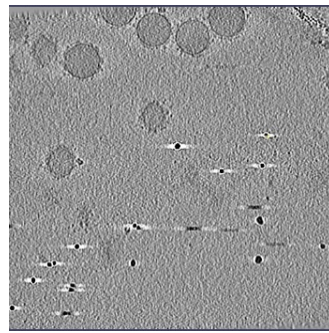
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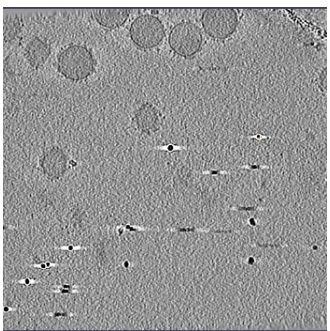
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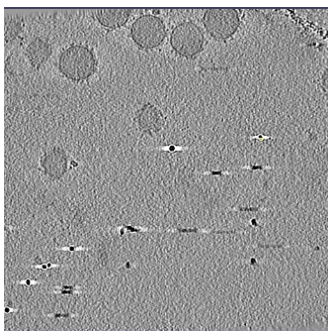
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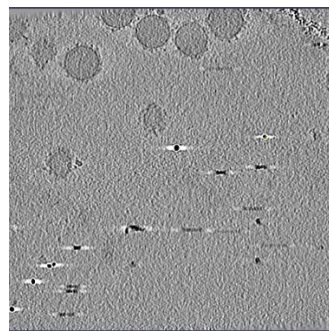
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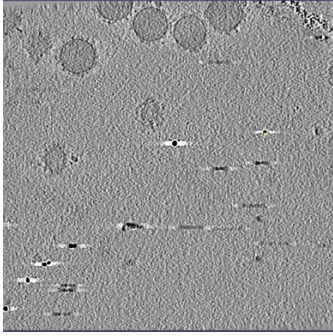
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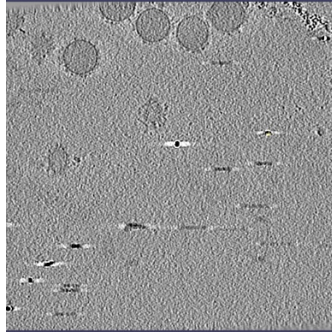
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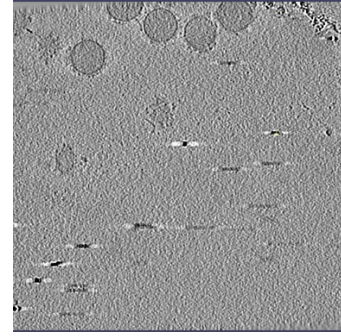
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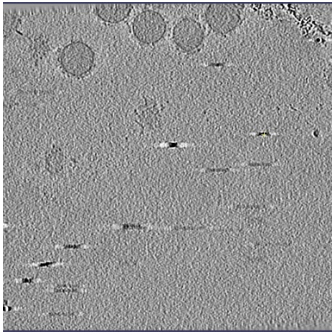
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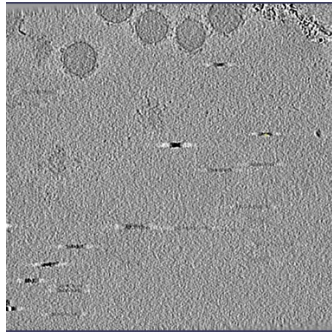
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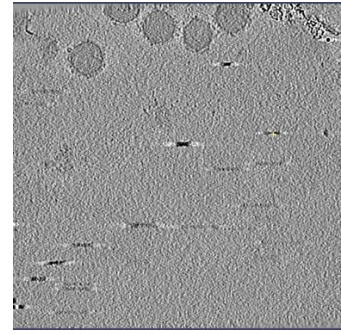
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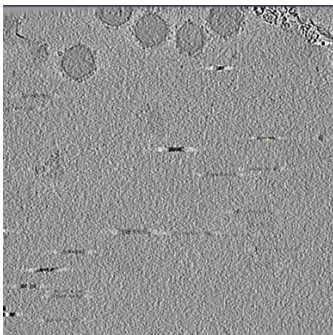
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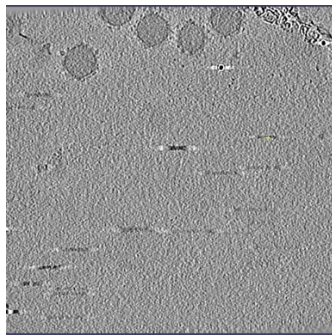
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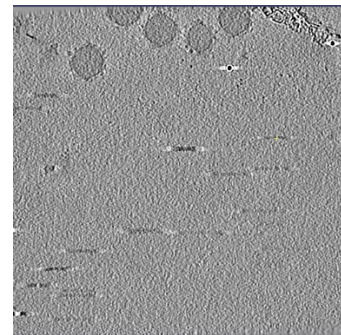
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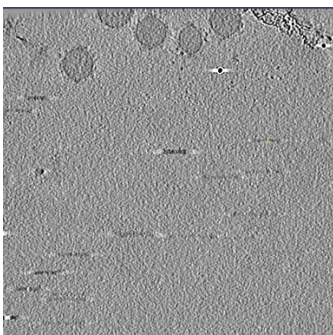
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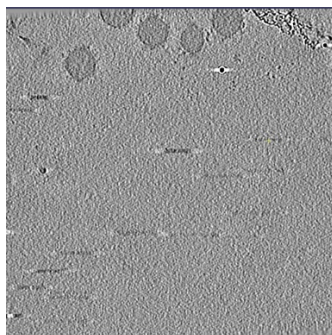
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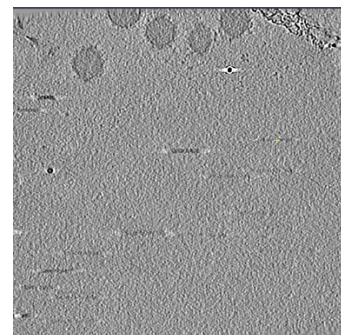
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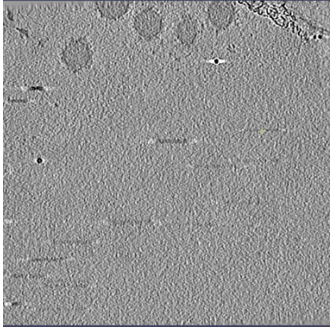
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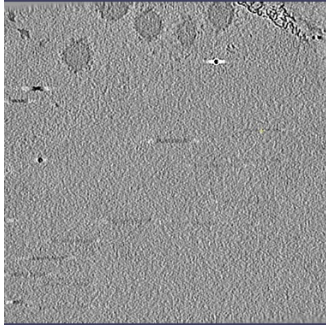
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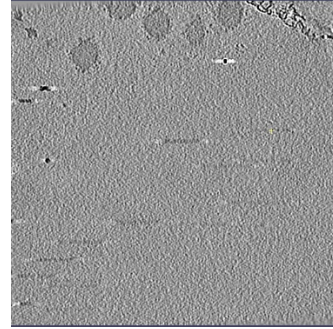
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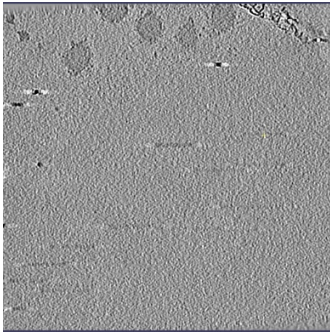
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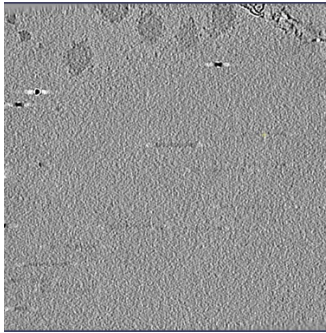
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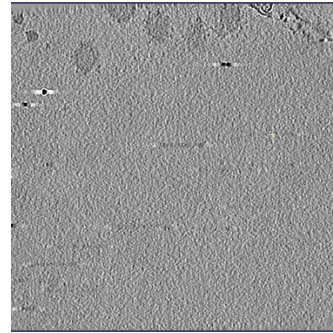
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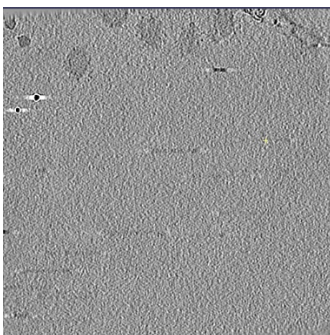
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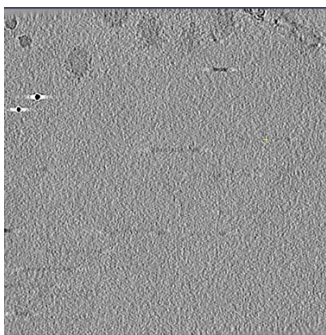
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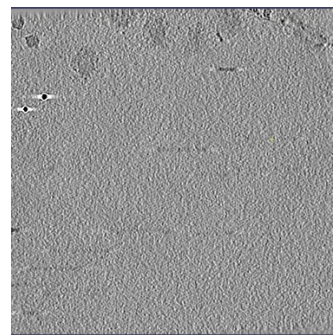
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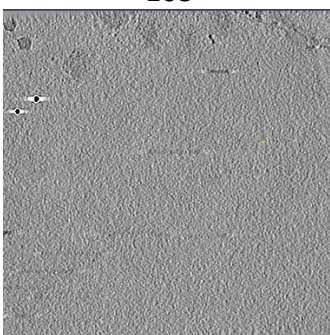
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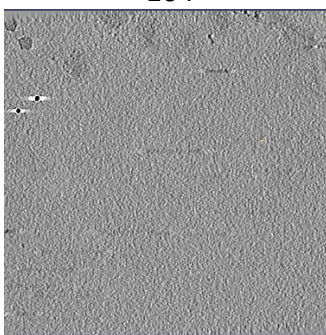
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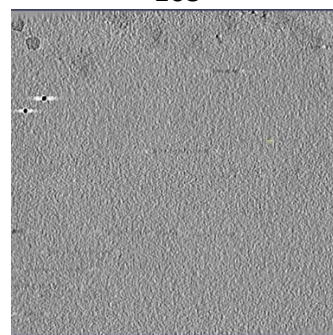
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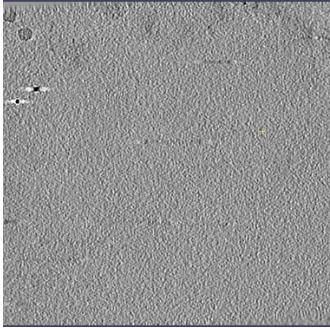
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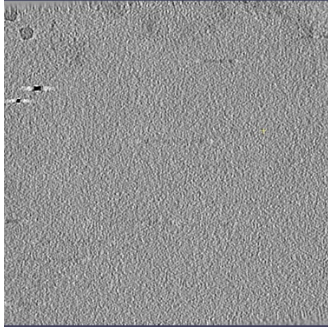
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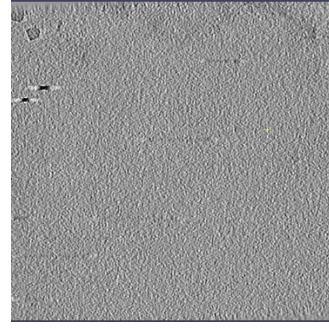
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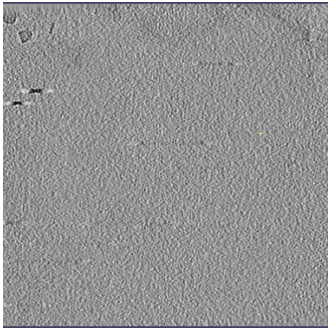
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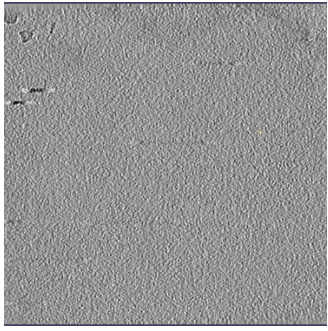
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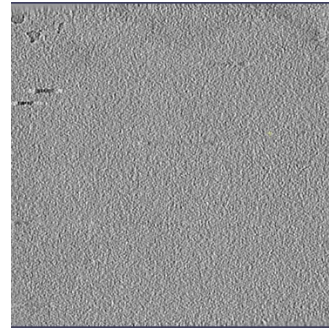
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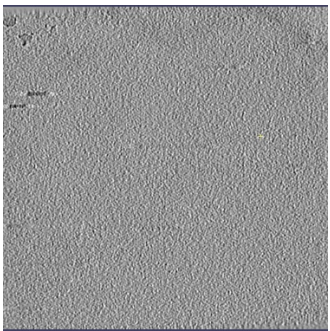
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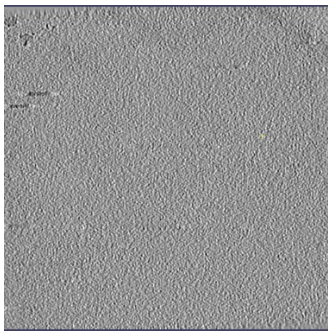
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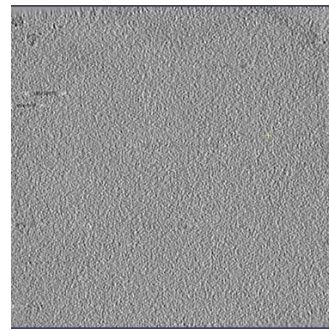
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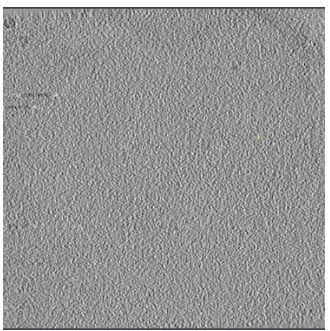
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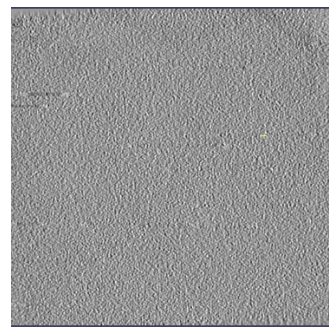
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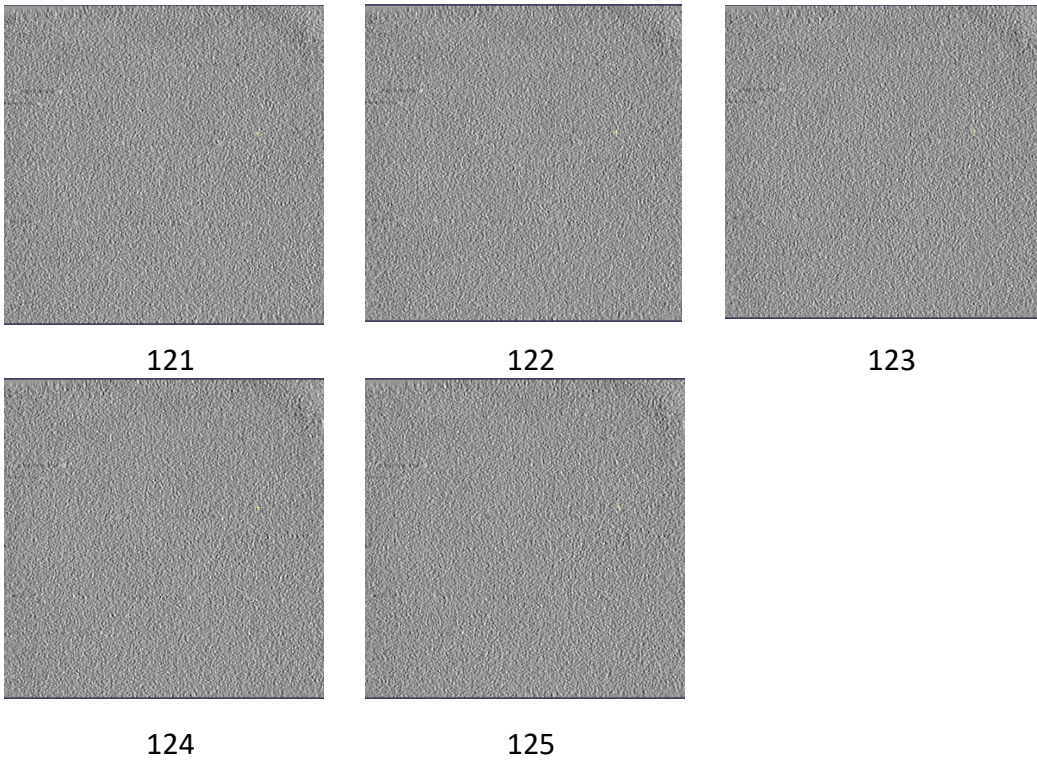
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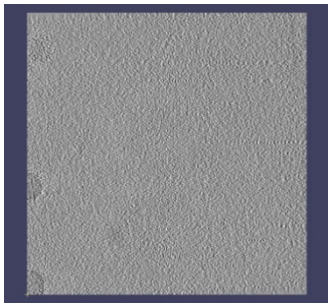
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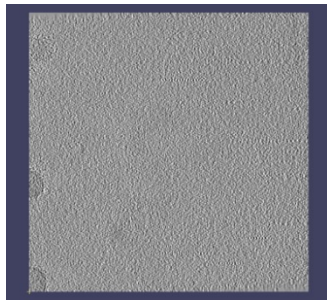
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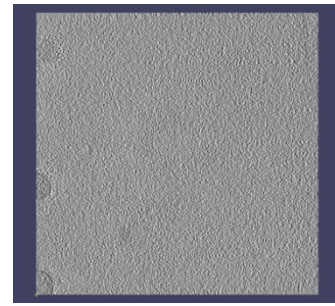
Supplementary Figure 3. TEM images showing the 3D tomographic volume slices of 10% corona coated NPs. The size of each image panel is 1 μ m



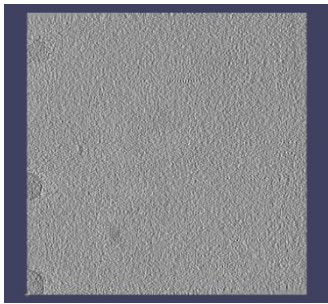
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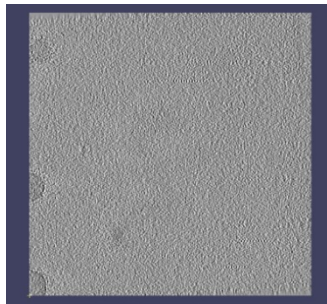
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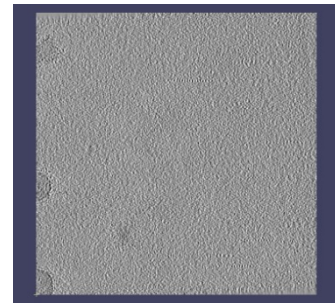
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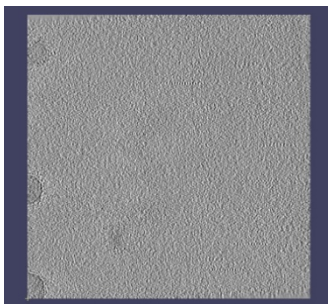
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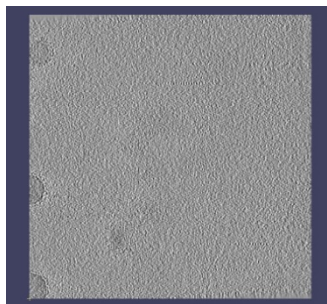
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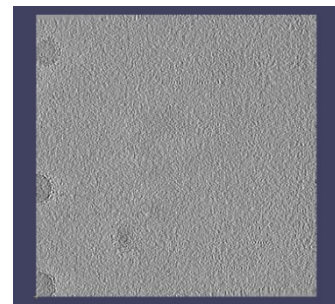
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7



8



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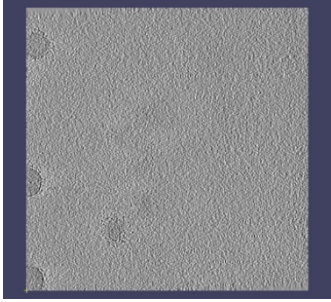
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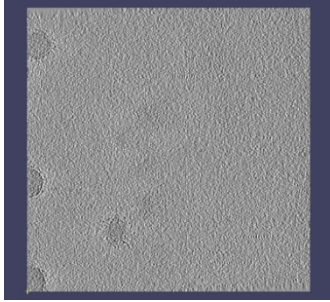
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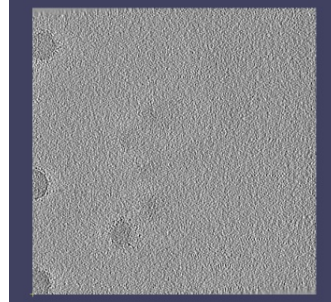
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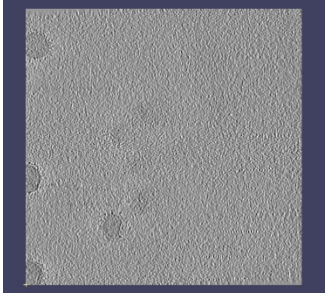
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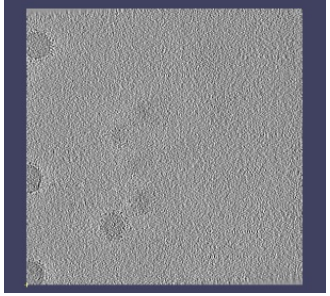
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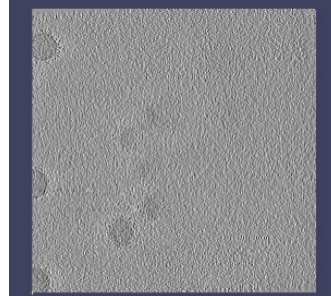
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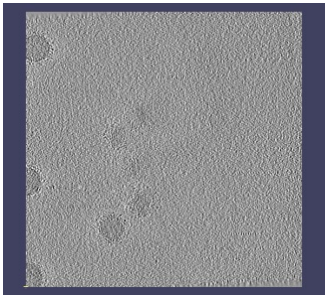
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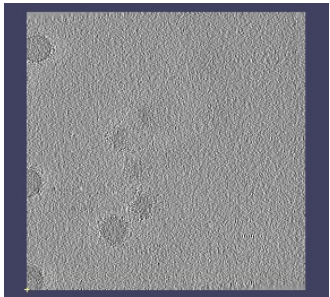
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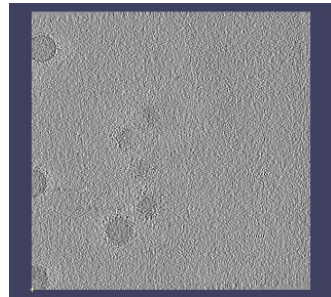
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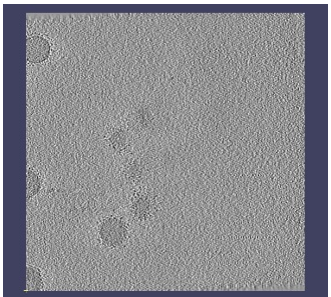
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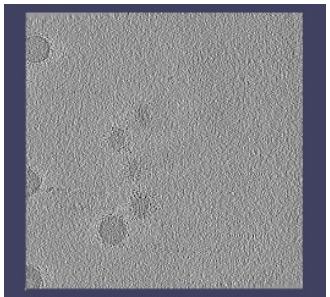
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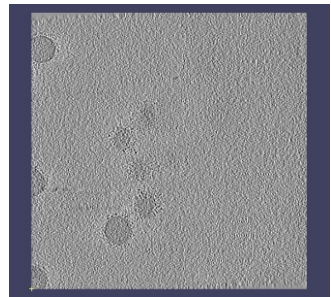
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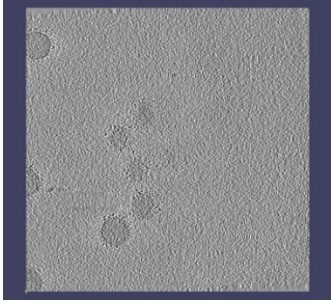
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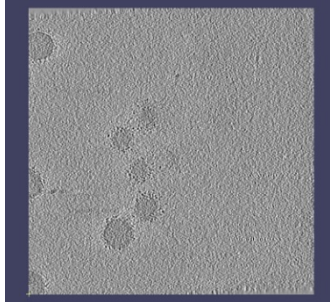
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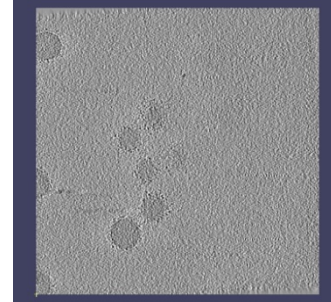
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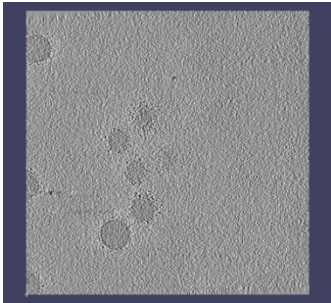
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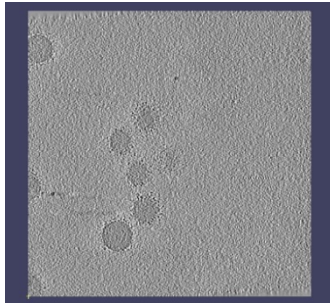
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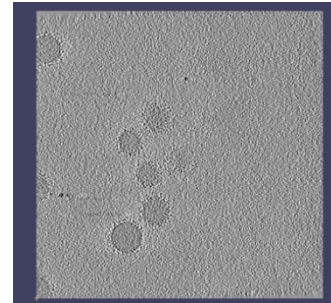
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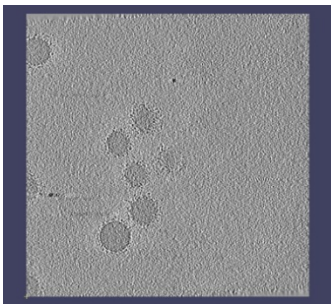
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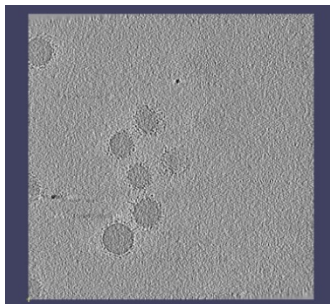
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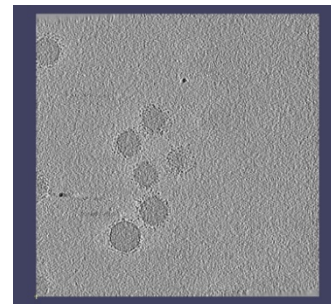
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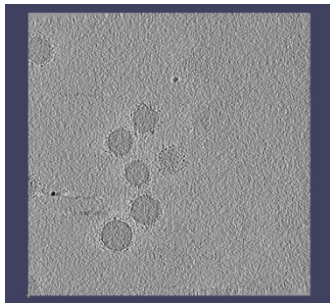
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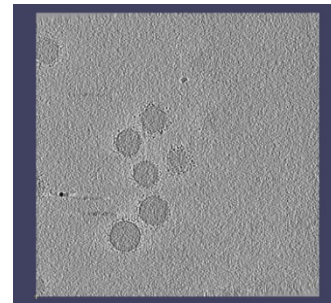
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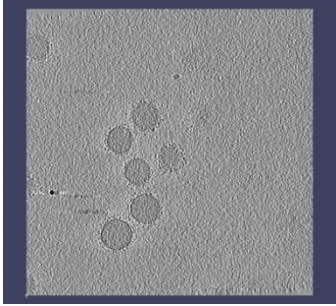
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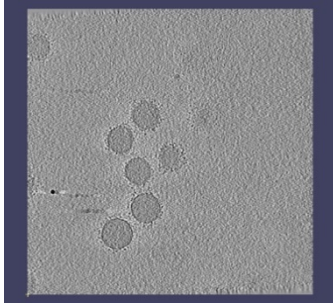
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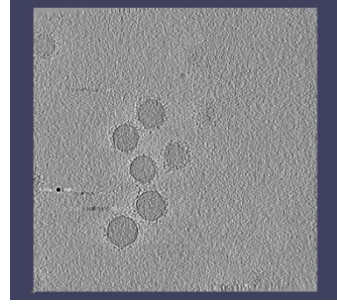
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37



38



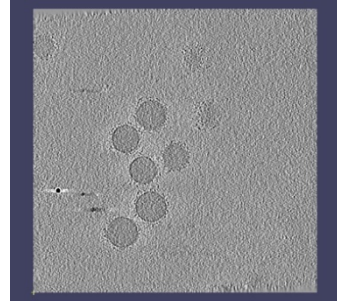
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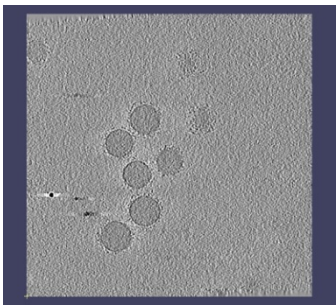
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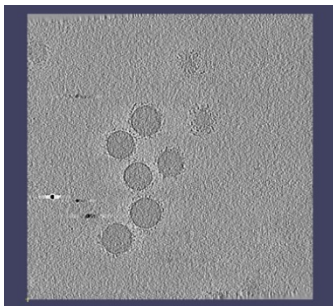
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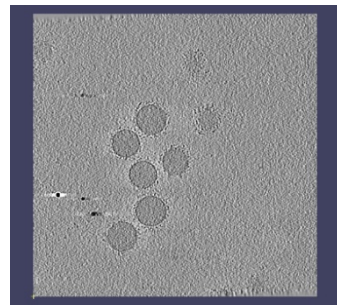
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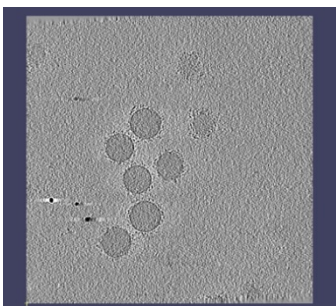
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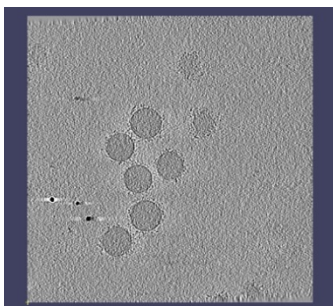
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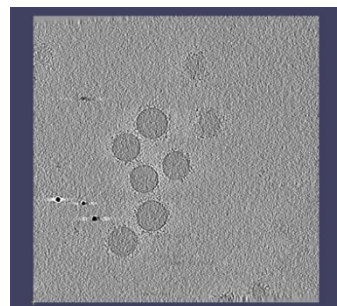
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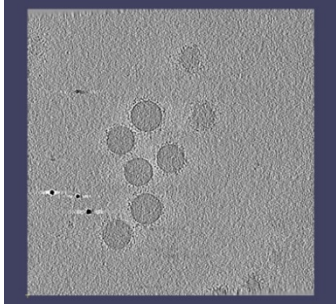
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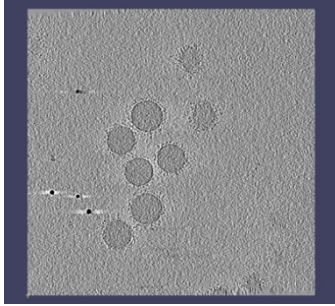
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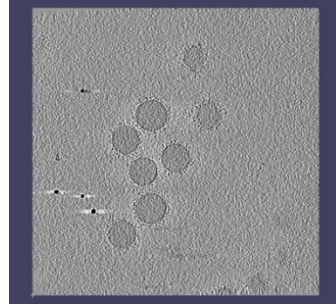
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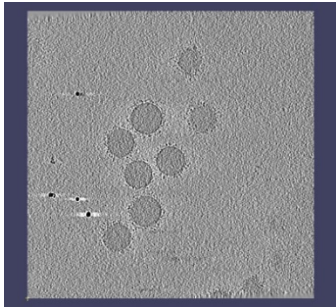
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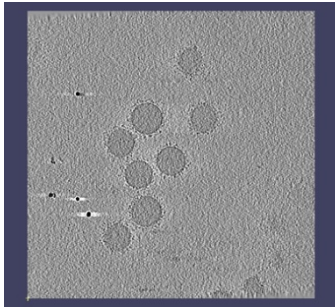
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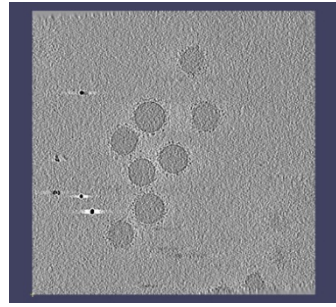
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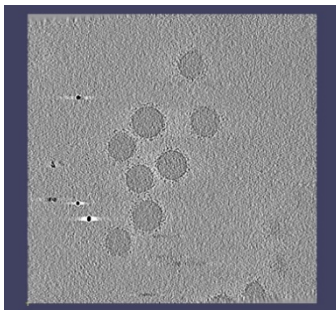
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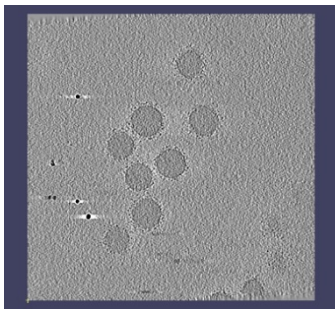
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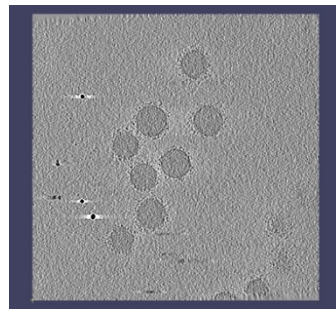
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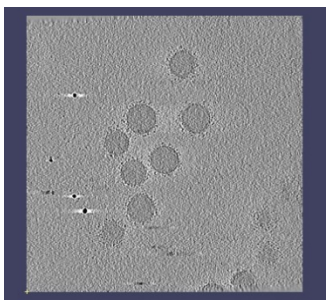
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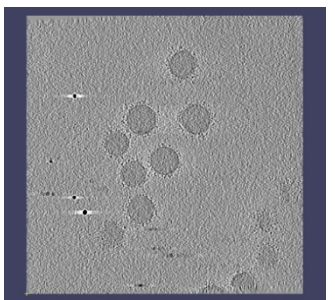
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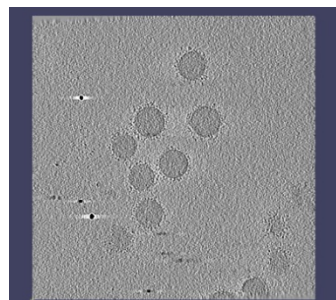
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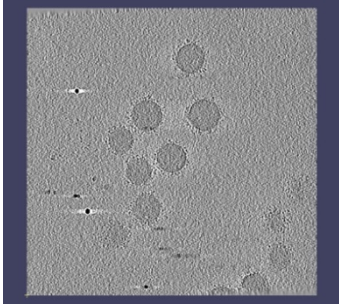
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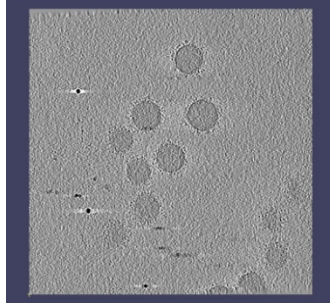
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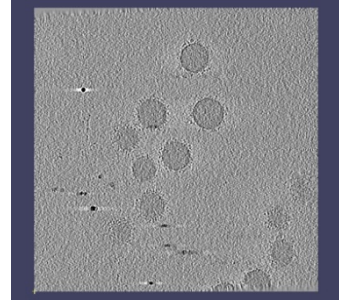
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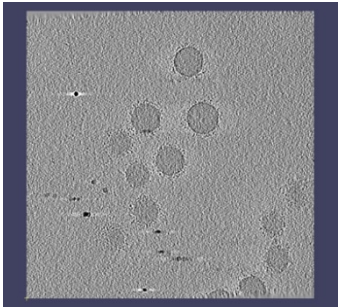
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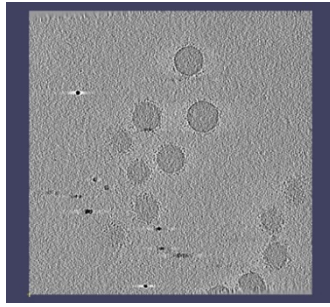
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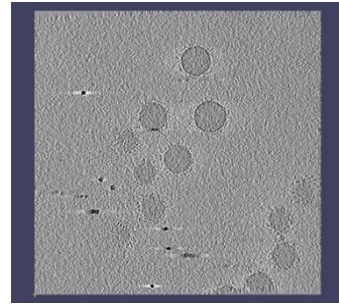
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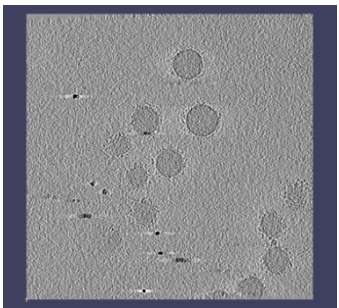
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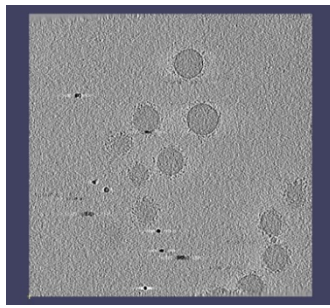
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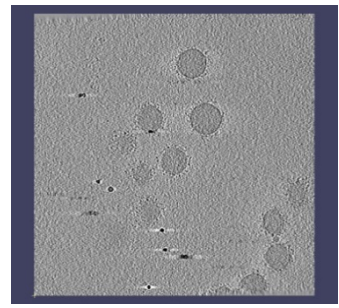
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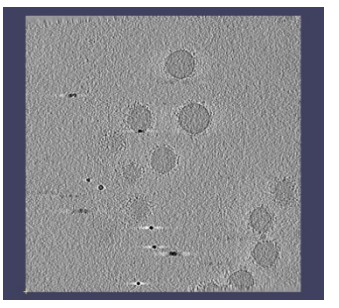
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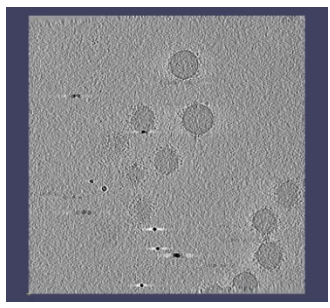
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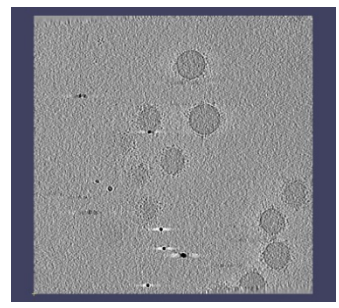
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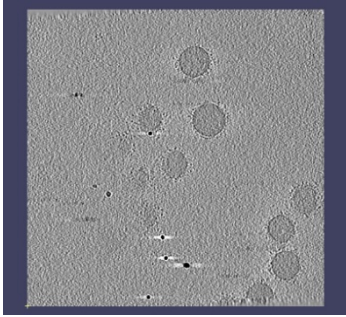
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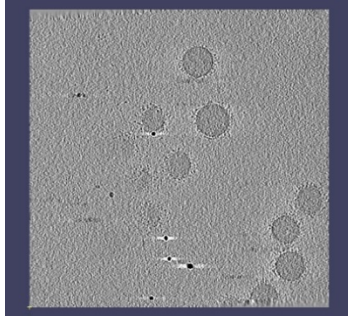
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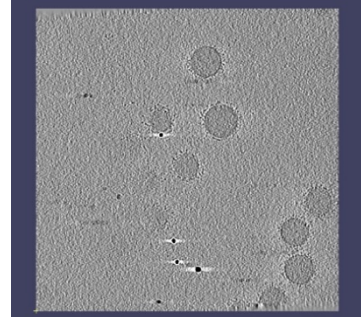
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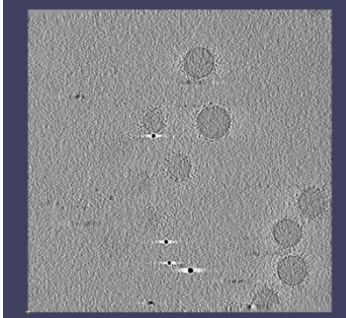
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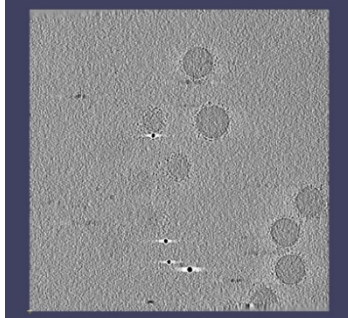
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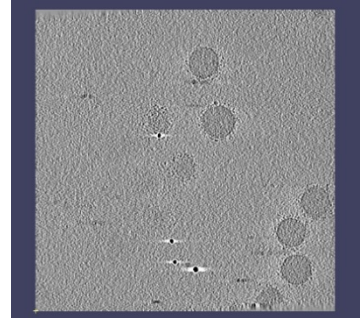
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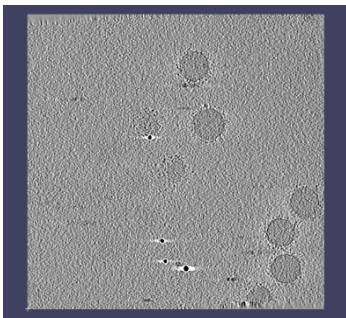
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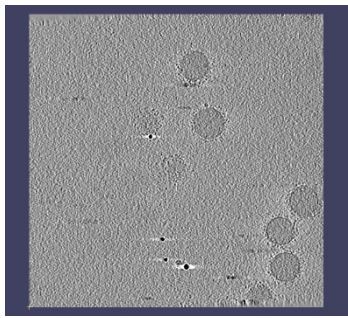
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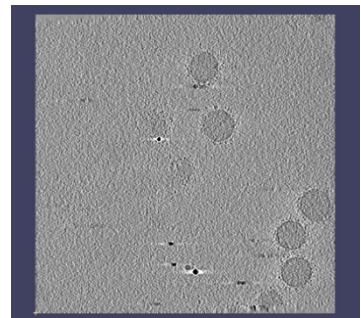
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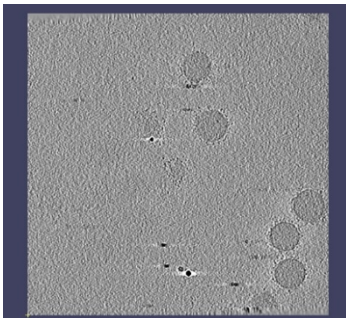
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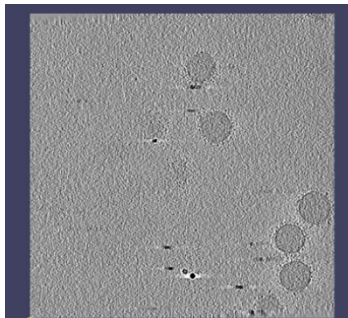
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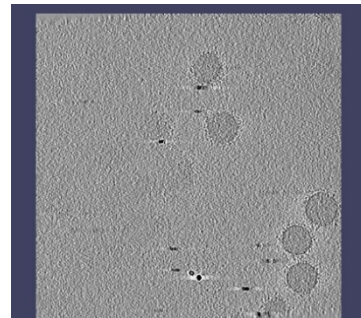
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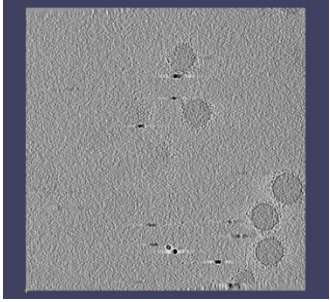
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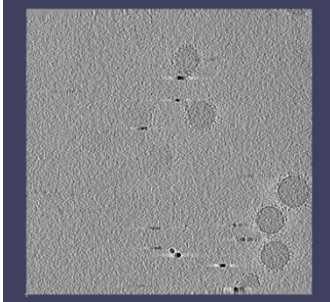
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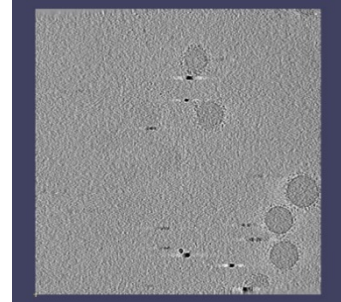
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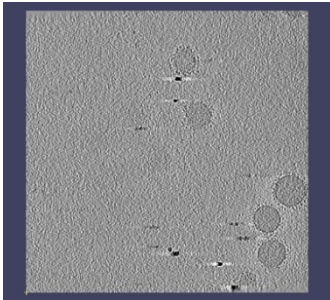
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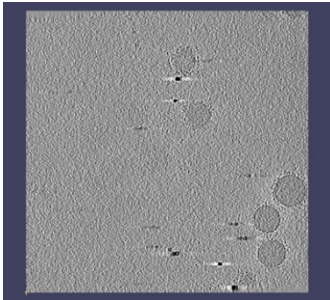
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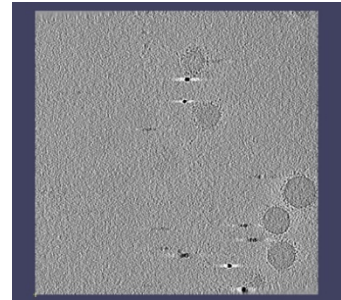
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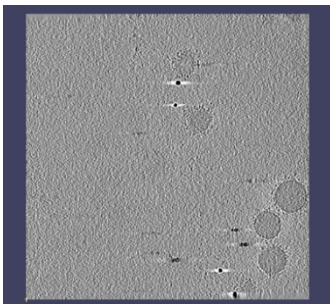
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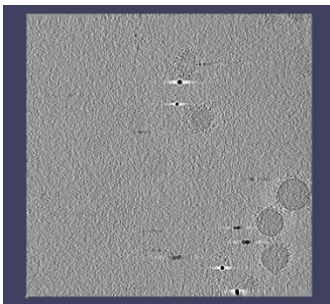
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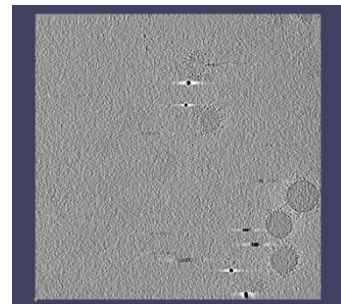
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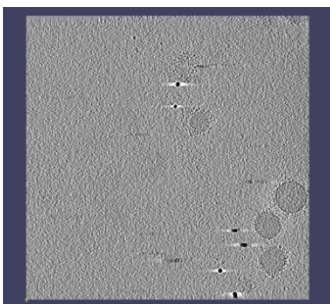
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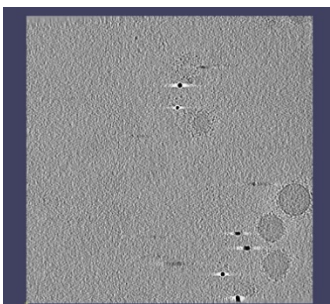
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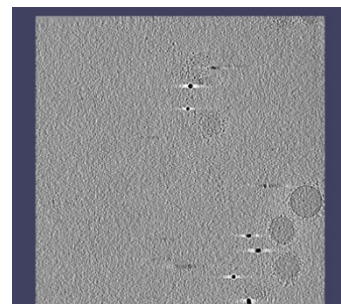
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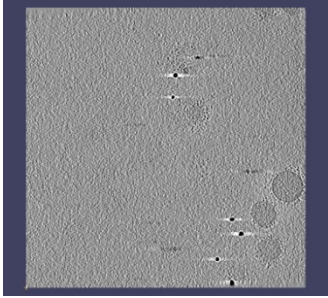
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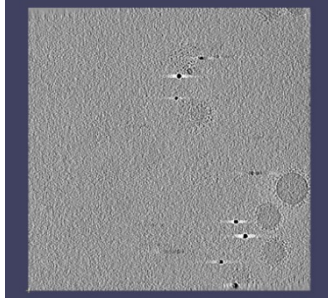
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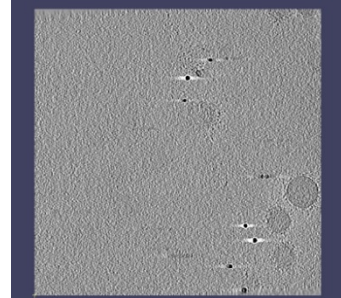
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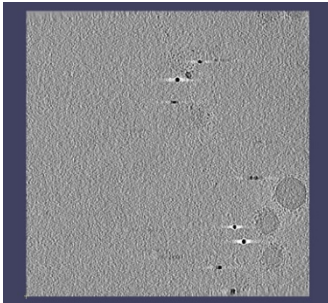
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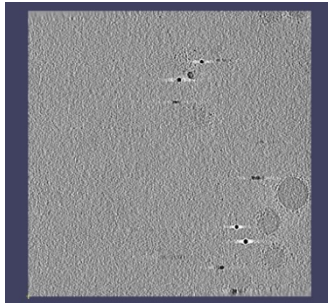
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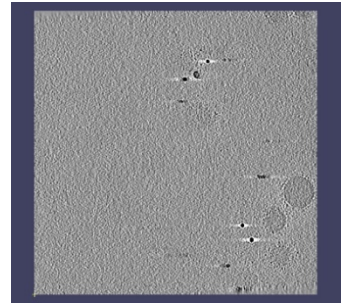
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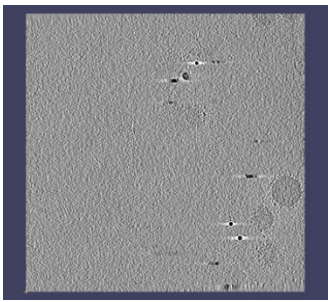
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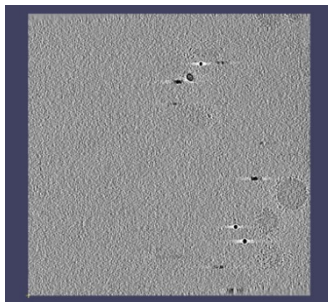
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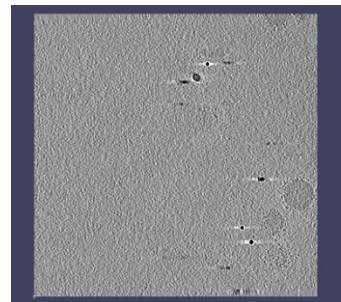
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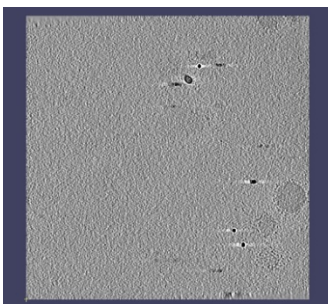
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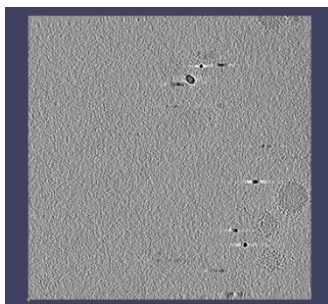
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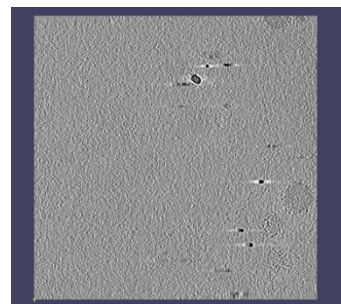
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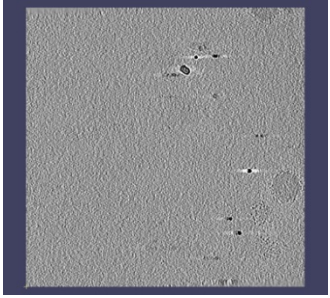
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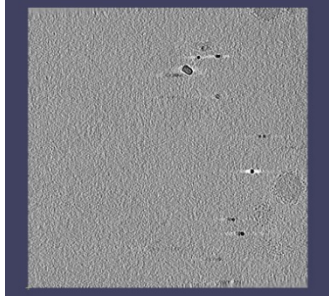
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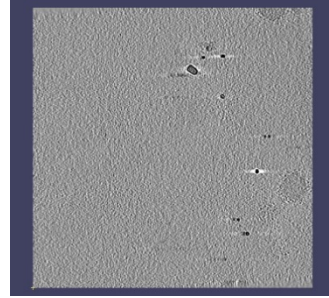
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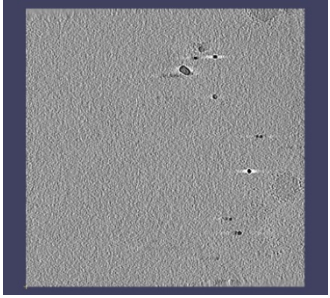
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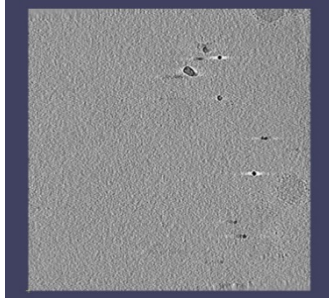
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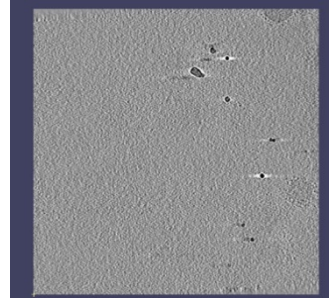
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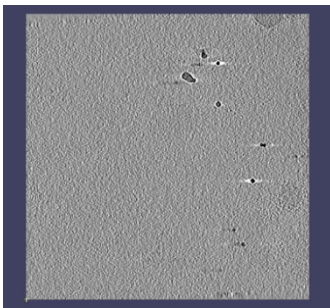
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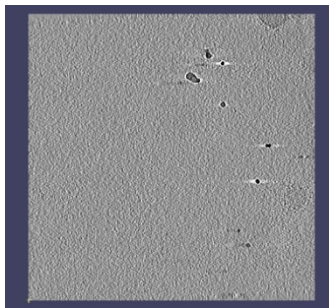
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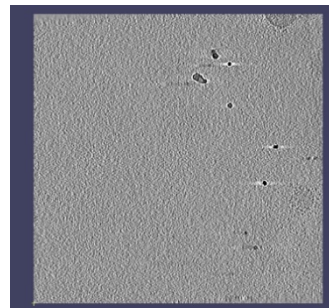
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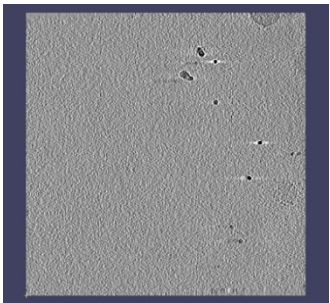
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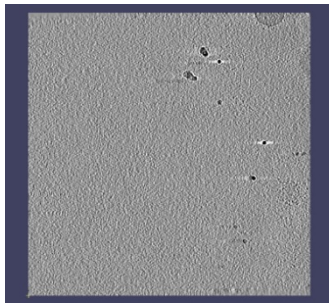
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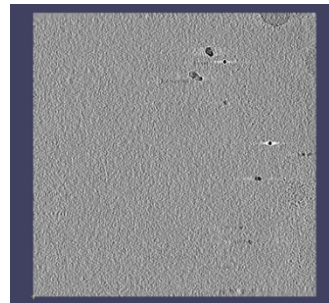
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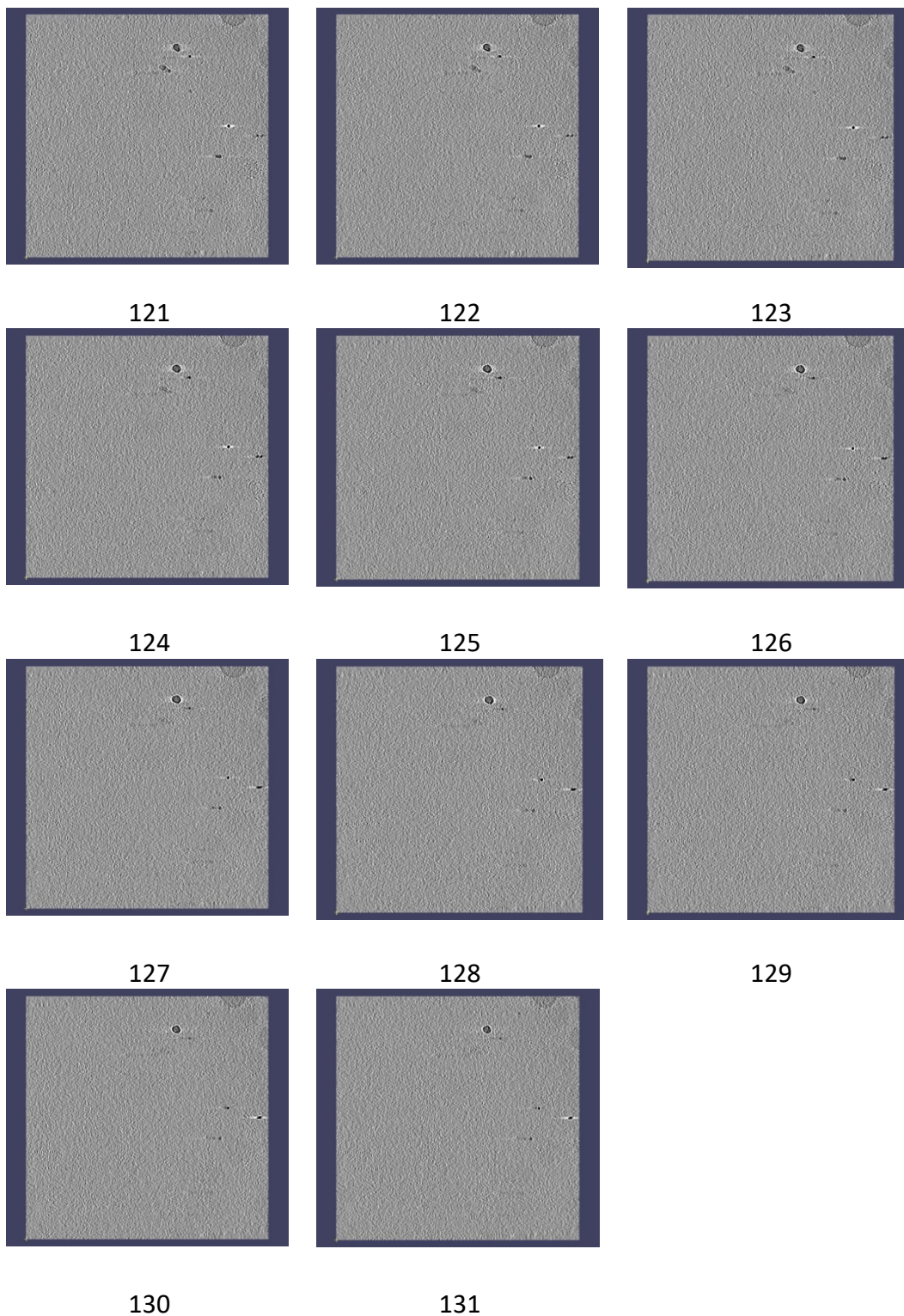
118



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Supplementary Figure 4. TEM images showing the 3D tomographic volume slices of 50% corona coated NPs. The size of each image panel is 1 μm.