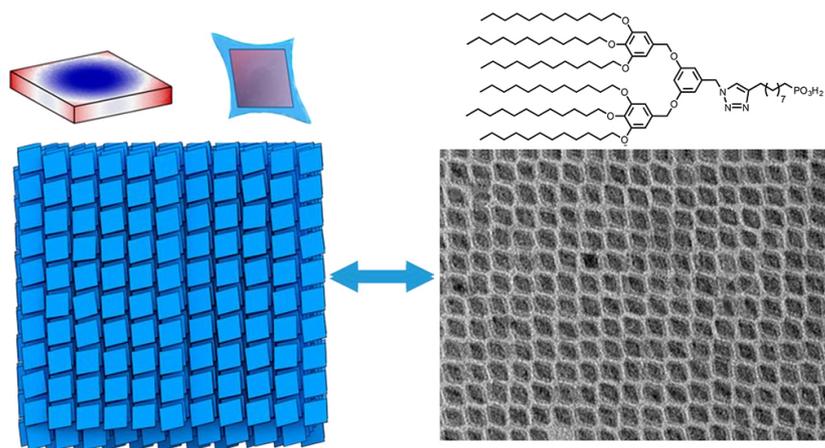


Understanding How to Tune Nanocrystal Architecture



(Left) The detailed simulation of ligand distribution and NC ordering. (Right) The transmission electron microscope image of the resulting multilayered material (bottom).

K. C. Elbert, T. Vo, N. M. Krook, W. Zygmunt, J. Park, K. G. Yager, R. J. Composto, S. C. Glotzer, C. B. Murray. *ACS Nano* **13**, 14241–14251 (2019).

Work was performed in part at Brookhaven National Laboratory

Scientific Achievement

Scientists revealed how important ligand design is for controlling the architecture of nanocrystals (NCs) during self-assembly.

Significance and Impact

NCs are important for applications such as filtration, wear resistance, and future quantum materials; these findings provide a systematic way to predict their directed self-assembled structure based on ligand design.

Research Details

- Scientists investigated a series of anisotropic NC assemblies using various ligand combinations.
- They studied the resulting structures using CFN's transmission electron microscopes (TEMs) and NSLS-II's CMS and SMI beamlines.
- The NC plates self-assembled into layers of two-dimensional grids that showed a distinct and controlled positional offset between layers.
- Simulations predicted the resulting architectures.