

New microscopy method provides more details about nanocomposites

April 11 2019

Scientists at the U.S. Department of Energy's Ames Laboratory have developed a new microscopy approach for imaging gel nanocomposites in their natural state, which will reveal more useful information about their assembly and properties.

Researchers are excited about imaging nanoparticles in poloxamers, a group of oddly-behaving polymer materials that are liquid at low temperature and a gel at [higher temperatures](#). Because of their interesting phase behavior, these gels show promise in potentially acting as a matrix medium for arrangement of nanoparticles within these gels to obtain materials with interesting optical properties. However, currently, it is very difficult to image nanoparticles within a gel environment.

Like the old idiom "nailing jelly to a wall," getting a close and accurate look at how these nanoparticle-and-gel systems organized themselves has proven difficult for scientists who want to learn more about their properties and how to control them.

"It's basically a goo. It's like honey when cold, and at [warmer temperatures](#) it sets into a something like Jello," said Tanya Prozorov, a scientist in Ames Laboratory's Division of Materials Sciences and Engineering. "It's a state of matter that doesn't lend itself well to the thin samples we use in TEM (transmission electron [microscopy](#)). Attempting to look at freeze-dried, thin-layer samples of the gel isn't ideal; valuable information gets lost."

Using a new approach with fluid cell scanning/[transmission electron microscopy](#), Prozorov and her colleagues used a molecular printer to deposit miniscule (femtoliter, one quadrillionth of a liter) volumes of poloxamer combined with gold nanoparticles, and observe them under controlled [temperature](#) and humidity.

The research is further discussed in the paper "New approach to electron microscopy imaging of gel nanocomposites in situ," authored by Alejandra Londono-Calderon, Srikanth Nayak, Curtis L. Mosher, Surya K. Mallapragada, and Tanya Prozorov; and published in *Micron*.

More information: Alejandra Londono-Calderon et al. New approach to electron microscopy imaging of gel nanocomposites in situ, *Micron* (2019). [DOI: 10.1016/j.micron.2019.02.010](https://doi.org/10.1016/j.micron.2019.02.010)

Provided by Ames Laboratory

Citation: New microscopy method provides more details about nanocomposites (2019, April 11) retrieved 22 September 2024 from <https://phys.org/news/2019-04-microscopy-method-nanocomposites.html>

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