# Scientists bring order, and color, to microparticles

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A team of New York University scientists has developed a technique that prompts microparticles to form ordered structures in a variety of materials. The advance, which appears in the *Journal of the American Chemical Society* (JACS) as an "Editors' Choice" article, offers a method to potentially improve the makeup and color of optical materials used in computer screens along with other consumer products.

The work is centered on enhancing the arrangement of colloids—small particles suspended within a fluid medium. Colloidal dispersions are composed of such everyday items such as paint, milk, gelatin, glass, and porcelain, but their potential to create new materials remains largely untapped.

Notably, DNA-coated colloids offer particular promise because they can be linked together, with DNA serving as the glue to form a range of new colloidal structures. However, previous attempts have produced uneven results, with these particles attaching to each other in ways that produce chaotic or inflexible configurations.

The NYU team developed a new method to apply DNA coating to colloids so that they crystallize—or form new compounds—in an orderly manner. Specifically, it employed a synthetic strategy—click chemistry—introduced more than a decade ago that is a highly efficient way of attaching DNA. Here, scientists initiated a chemical reaction that allows molecular components to stick together in a particular fashion—a process some have compared to connecting Legos.

In a previous paper, published earlier this year in the journal *Nature Communications*, the research team outlined the successful execution of this technique. However, the method, at that point, could manipulate only one type of particle. In the JACS study, the research team shows the procedure can handle five additional types of materials—and in different combinations.

The advance, the scientists say, is akin to a builder having the capacity to construct a house using glass, metal, brick, and concrete—rather than only wood.

"If you want to program and create structures at microscopic levels, you need to have the ability for a particle to move around and find its optimal position," explains David Pine, a professor of physics at NYU and chair of the Chemical and Bioengineering Department at NYU Polytechnic School of Engineering. "Our research shows that this be done and be achieved with multiple materials, all resulting in several different types of compounds."

**More information:** *Journal of the American Chemical Society* DOI: 10.1021/jacs.5b06607

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