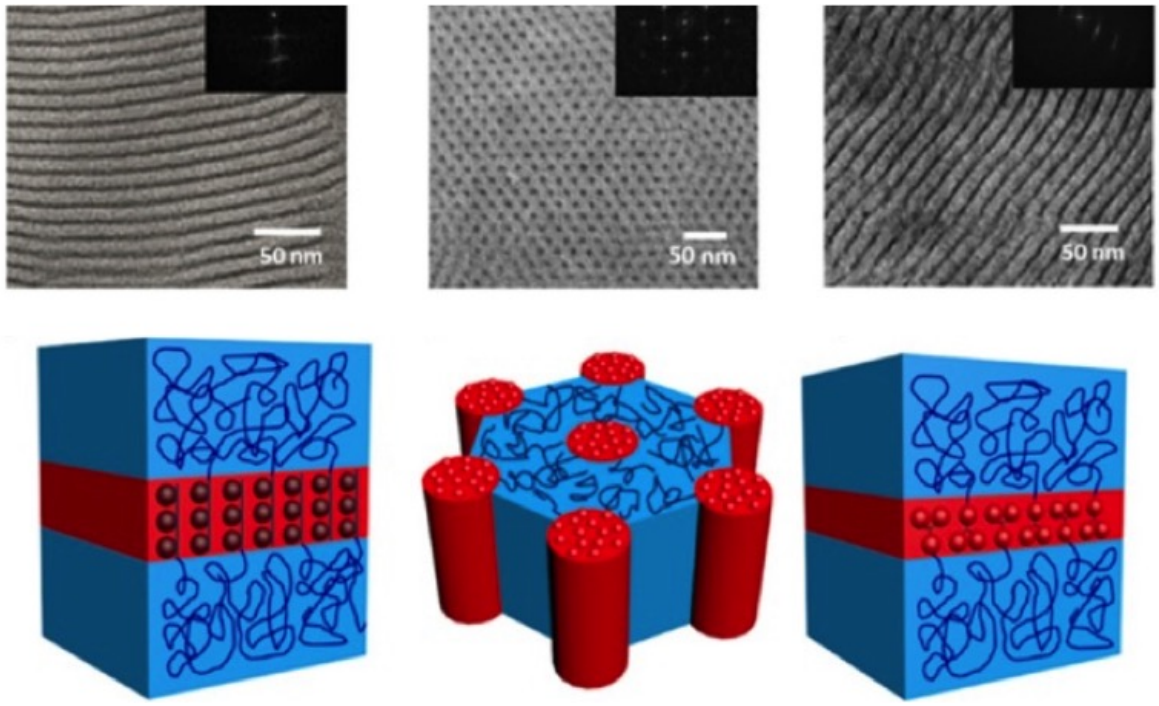
Fun with Lego (molecules)

January 27 2016



Depending on the relative amounts of different building-block molecules, it is possible to create different sandwich and wheel topologies (shown above in micrographs and below as models). Credit: American Chemical Society. Copyright 2016

A great childhood pleasure is playing with Legos and marveling at the variety of structures you can create from a small number of basic elements. Such control and variety of superstructures is a goal of polymer chemists, but it is hard to regulate their specific size and how

the pieces fit together.

This week in *ACS Central Science*, researchers report a simple system to make different nano-architectures with precision.

Using a variety of highly efficient chemical transformations and other techniques to ensure high yields and purity, Stephen Z. D. Cheng, Yiwen Li, Wen-Bin Zhang and coworkers designed systems to create giant molecules with 'orthogonal' ends, meaning that they only fit together with a specific partner just like Legos.

Depending on the relative amounts of different building-block molecules, these molecules come together in different superstructures—ranging from cubes to wheels and sandwiches.

Eventually, they could be employed in device-creation, where it is crucial to have precise control over the positions of the components.

More information: Wei Zhang et al. Toward Controlled Hierarchical Heterogeneities in Giant Molecules with Precisely Arranged Nano Building Blocks, *ACS Central Science* (2016). DOI: 10.1021/acscentsci.5b00385

Provided by American Chemical Society