

"Long before it's in the papers"

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Strange crystals found to twist as they grow

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Courtesy of the American Chemical Society
and World Science staff

Chemists have created crystals that can twist and untwist, pointing to a much more varied process of crystal growth than was previously known, they say.

Their work, published in the latest issue of the *Journal of the American Chemical Society*, may explain some of the properties of high-polymers, used in products including clothing and liquid crystal displays.

Crystal growth has traditionally been viewed as a collection of individual atoms, molecules, or small clusters adding to a larger block that remains in a fixed spatial relationship to the rest. But chemists from New York University and Russia's St. Petersburg State University found a crystal that continually changes its shape as it grows.

"This dynamic has not been observed before and points to a much more active process of crystal growth than we had anticipated," said NYU chemist Bart Kahr.

The researchers focused on crystals from hippuric acid—a derivative of the amino acid glycine, one of the components of protein molecules found in the body.

As molecules were added to the end of fine crystalline needles, stresses built up at the tips of the crystals and resulted in a helical twist, much like DNA's double helix, the investigators found. The process was reversed when crystals thickened from the opposite end of the growing tip—that is, the crystals stiffened, thereby undoing the twisted formations. This is because the elasticity of the crystals decreases as they become thicker, thus "squeezing out" the deformations that were induced at the growing tip, the scientists said.

"This competition between twisting and untwisting creates needles with a rainbow of colors, which is a characteristic of tightly wound helices, as well as ribbons that have become completely untwisted," said Kahr. "This is a very strange and new perspective on crystal growth."