Volume 89 Issue 45 | November 7, 2011 | p. 25 | Concentrates

Molecule Tied In Pentafoil Knot

By Elizabeth K. Wilson

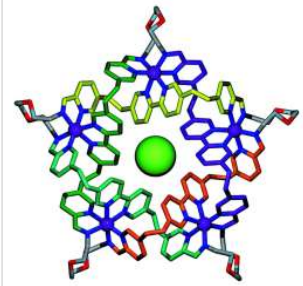
Department: Science & Technology
Keywords: pentafoil knot, one-pot synthesis, molecular assembly

Science & Technology Concentrates

Eyes For 11-*cis*-Retinal
Cisplatin Hitches A Ride On RNA
Origami-Based Microfluidics
Talc's Duplicity Toward Water
Molecular Symmetry Sets Surface Disco Dance Moves
More Aziridines Now Accessible
Molecule Tied In Pentafoil Knot
Alkaloid Acetylaranotin Made After 40-Year Quest
All Concentrates

Chemists have combined five multicomponent molecules into the shape of a pentafoil knot, the most complex non-DNA molecular knot yet created (*Nat. Chem.*, DOI: 10.1038/nchem.1193). Knots are common motifs in DNA and proteins. But until now, chemists had only succeeded in synthesizing non-DNA molecules into much simpler trefoil knots. **David A. Leigh** of the University of Edinburgh and colleagues developed a one-pot method in which five bis-aldehyde and five bis-amine species mix with up to five iron cations and a chloride anion. The molecule self-assembles into a 160-atom monster loop with five crossing points, which surrounds the chloride anion. The molecular knot binds chloride extremely strongly and selectively over other anions, a property that could lead to application as a chemical sensor, the researchers note. "We anticipate that the strategies and tactics used here can be applied to the rational synthesis of other higher order interlocked molecular architectures," they write.

[+]Enlarge



A pentafoil knot self-assembles in one pot; Fe^{2+} are blue spheres, Cl^- is a green sphere, bis-amines are gray and red, and bis-aldehydes are represented by other colors.

Credit: Nat. Chem.

Chemical & Engineering News
ISSN 0009-2347

Leave A Comment

MOST POPULAR

Viewed Commented Shared

Call In The Food Fixers (2754 views)
Novartis To Cut 2,000 Jobs (1509 views)
Alkaloid Acetylaranotin Made After 40-Year Quest (1310 views)
Good and Bad News About Fukushima's Impact On Ocean (1077 views)
DOE Loan Program Scrutinized (993 views)

RELATED ARTICLES

Tying Up Loose Ends, Chemically Speaking
Cages Covalently Interlocked
Enzyme Has Most Complex Protein Knot Yet Seen

Thank you for your comment. Your initial comment will be reviewed prior to appearing on the site. Please check back in a few minutes to see your post.

Name

Email Address(Required to comment)

Submit Query

Chemical & Engineering News

Home
Magazine
News
Departments
Collections
Blogs
Multimedia
About

Subscribe
Advertise
Contact
Join ACS

Help
Sitemap
Search
Submit Query
Advanced Search

American Chemical Society

ACS.org
Journals
CAS