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.
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