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Caterpillar Track Complexes in Template-Directed Synthesis and Correlated Molecular Motion
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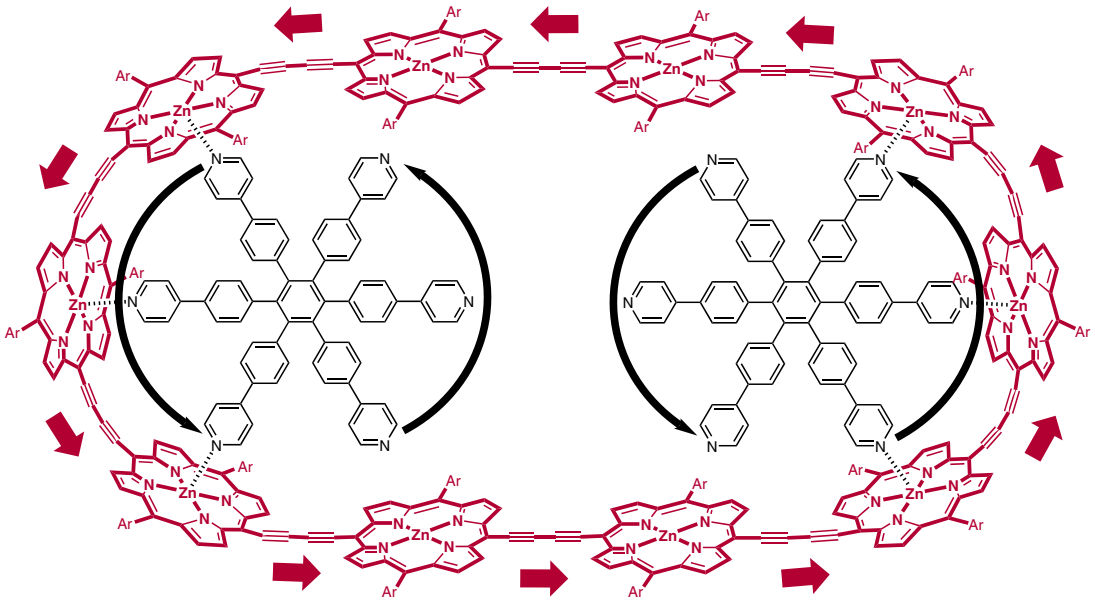
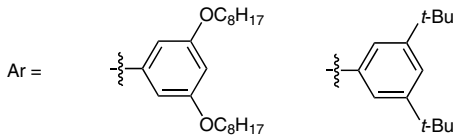
Turning the Caterpillar Track



Caterpillar track complex, *c*-P10-(T6)$_2$



Significance: Oligo-pyridines have been used as templates to direct the synthesis of zinc-porphyrin nanorings. The authors showed that a hexapyridyl template directed the synthesis of a cyclic zinc-porphyrin hexamer, removal of one binding site on the hexapyridyl template produced a cyclic decamer and removal of two binding sites produced a cyclic octamer. An interesting discovery of these zinc-porphyrin nanorings is that while the nanorings are static when they are coordinatively saturated with the binding sites on the pyridine templates, these assemblies undergo caterpillar track motion when coordinating to hexapyridyl templates with free binding sites.

Comment: Zinc-porphyrin nanorings were purified by size exclusion chromatography and recycling gel permeation chromatography (GPC). The caterpillar track motion of these assemblies was studied by 1D exchange spectroscopy (EXSY) NMR. This is an elegant system demonstrating the control of correlated motions on molecular scale. Addition of [$PdCl_2(PhCN)_2$] halted the caterpillar track motion in these assemblies by binding palladium between the two hexapyridine templates.

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Category
Synthesis of Materials and Unnatural Products

Key words
template-directed synthesis
molecular motion
exchange spectroscopy
porphyrin nanorings
oligo-pyridines