“Foldamers: A New Approach to Catalysis”
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Nature’s Approach to Catalysis
Preorganization of Reactive Groups → Rate Accelerations

Foldamers: Predictable, Diverse, 3D Arrangements of Catalytic Groups

β-Peptide
1:2 α/β-Peptide
1:1 α/β-Peptide

Electrophile Activation
Nucleophile Activation

Explore Reactivity
Novel Reactions
Mechanism
Controlled Energy Transfer?

Foldamer-templated Macrocyclization
Identifying Foldamer Features Critical to Catalysis

Foldamer : 86 %
Small Molecule : 3 %
55 %
19 % cyclodimer

Foldamer : 88 %
Small Molecule : 7 %

Foldamer : 97 %
Small Molecule : 8 %

Applications in Natural Products: Total Synthesis of Robustol & Core of Nostocyclyne A

Moving Forward

Foldamers as Chiral Scaffolds for Photoredox Catalysis

References
Girvin, Z. C.; Gellman, S. H. JACS, 2018, 140, 12476-12483