The Effect of Regiochemistry on Naphthopyran Mechanochromism

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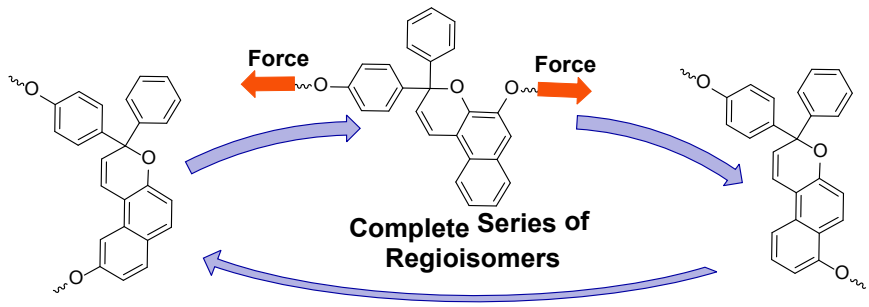
Mechanical force can be used to activate chemical transformations of mechanically sensitive molecules, called mechanophores, while polymers serve to transduce an external load to a particular covalent bond. Mechanophores that change color upon activation are valuable for damage sensing applications and we have recently developed a new mechanochromic mechanophore based on naphthopyran. Intriguingly, experimental and theoretical studies of three different regioisomers revealed that only one is mechanochemically active, being converted to its colored merocyanine form under mechanical force. In order to enhance fundamental understanding of the naphthopyran mechanophore system, we have expanded the investigation of naphthopyran mechanochemistry to include a comprehensive series of regioisomers to probe the effect of regiochemistry on the efficiency of mechanophore activation. This research will provide insight into structure-mechanochemical activity and toward achieving the rational design of new mechanophores.



Three Component Cu-Catalyzed Carboamination of Olefins

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Three component, catalytic coupling reactions offer a powerful means of rapidly generating complex molecular structures from simple substrates. Although the catalytic addition of both carbon and nitrogen functionalities across an olefin in a single operation is recognized as a valuable transformation, no such three component coupling reaction has been devised. We have addressed this deficiency by developing a Cu-catalyzed carboamination reaction of olefins that utilizes α-haloesters and arylamines as the carbon and nitrogen sources, respectively, providing access to functionalized γ-lactams and γ-amino esters in excellent yield.