Reactivity of Imidazolidine-4-thione Derived Enamines and Iminium Ions

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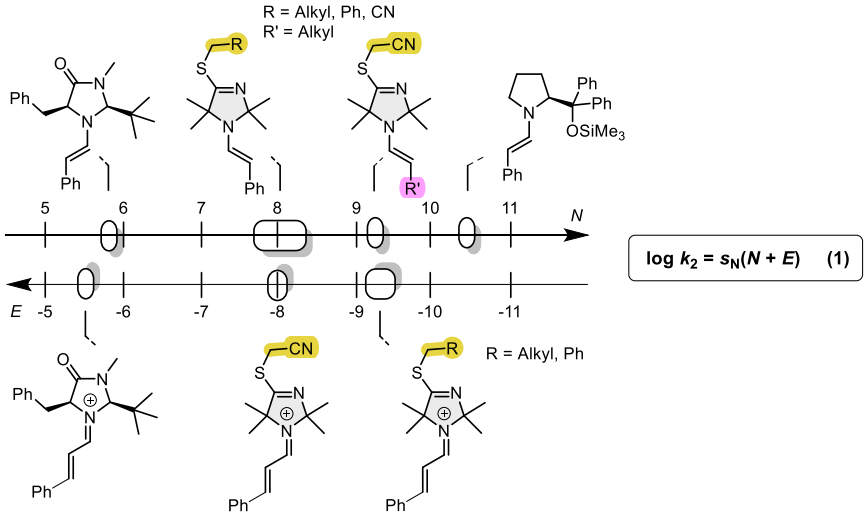
Imidazolidine-4-thiones are structurally similar to MacMillan organocatalysts, but examples utilizing them as catalysts are rare in the literature.[1,2a] Only recently, it has been discovered that imidazolidine-4-thiones are efficient as catalysts in the alkylation of aldehydes by bromoacetonitrile under prebiotic early Earth conditions.[2]

By following the kinetics of reactions between imidazoldinethione derivatives with reference compounds of known electrophilicity parameter *E* or nucleophilicity parameter *N* and s_N, the Mayr-Patz equation (1) can be applied to garner a better understanding of the reactive intermediates generated by these underexplored organocatalysts.



This presentation will be centered around the reactivity of the nucleophilic enamines and electrophilic iminium ions derived from imidazoldine-4-thiones, which will be compared to those derived for structurally related imidazolidinones (MacMillan) and proline-based systems (Hayashi-Jørgensen), whose reactivities have previously been characterized.[3] Quantification of the reactivity parameters of imidazolidinethiones will provide insight into how these organocatalysts promote organic reactions under both prebiotic and modern lab conditions.

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References

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