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Green chemistry techniques in organic synthesis and catalysis

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Abstract

The development of novel synthetic methods that are environmentally benign, use non-toxic solvents, and/or limit the generation of hazardous waste is of growing interest due to the pressing need for environmentally responsible chemical synthesis. Methods to address this need have been developed in recent years, including the use of aqueous solvent systems, the development of solvent-free syntheses, and the use of metal-free catalysis. Reported herein is a new approach, the use of supramolecular host: guest complexation, to enable high-yield, high-impact syntheses. This approach uses β-cyclodextrin, a non-toxic, naturally occurring cyclic oligosaccharide, to facilitate both Diels-Alder and benzylic oxidation reactions under mostly aqueous conditions and provide access to high-value organic chemistry products. The scope of these reactions, optimized reaction conditions, and mechanistic hypotheses to support the high system performance will also be discussed.

Biography

Mindy Levine completed her Ph.D. from Columbia University in 2008, working under the guidance of the late Professor Ronald Breslow. She then did a postdoctoral fellowship at MIT in the laboratory of Professor Timothy Swager before starting her career as an independent faculty member at the University of Rhode Island in 2010. In 2019, she moved to Ariel University in Israel, where she is currently an Associate Professor of Chemistry. She has published more than 60 peer-reviewed publications that have been cited more than 1100 times, has two provisional patents filed, and has presented her research over 200 times. She is an editorial board member of the journal Supramolecular Chemistry, and is currently guest-editing an issue in the Israel Journal of Chemistry.

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