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YOUNG MACRO-MOLECULAR RESEARCHER WEBINAR SERIES

Tue 5-March 2024 15:00-15:45 (UK)

Dr. Lucca Trachsel, University of Florida

Diversification of Acrylamide Polymers via Direct Transamidation of Unactivated Tertiary Amides

Post-polymerization modification offers a versatile strategy for synthesizing complex macromolecules, yet modifying acrylamide polymers like poly(*N*,*N*-dimethylacrylamide) (PDMA) is notoriously challenging due to the inherent stability and low reactivity of amide bonds. In this study, we unveil a novel approach for the direct transamidation of PDMA, leveraging recent advances in the transamidation of unactivated tertiary amide substrates. By exploiting photoiniferter polymerization, we extended this direct transamidation approach to ultra-high molecular weight (UHMW) PDMA, showcasing the unprecedented post-polymerization modification of synthetic polymers exceeding 106 g/mol. This work not only broadens the scope of post-polymerization modification strategies by pioneering direct transamidation of unactivated amides but also provides a robust platform for the design of intricate macromolecules, particularly in the realm of UHMW polymers.

Dr. Kostas Parkatzidis, Stanford University

Photocatalytic Depolymerization of Polymers Made via Controlled Radical Polymerization

Chemical recycling of polymers, synthesized by controlled radical polymerization, back to monomer enables the regeneration of virgin-quality raw materials which can be subsequently subjected to an unlimited number of re-polymerization/recycling cycles. Present chemical recycling strategies typically operate under extreme dilute conditions, require high temperatures and catalyst loadings, and do not allow for temporal regulation over depolymerization. In this talk, I will share our recent results about the photocatalytic depolymerization strategies that allow for the successful depolymerization of polymers alongside temporal control.

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