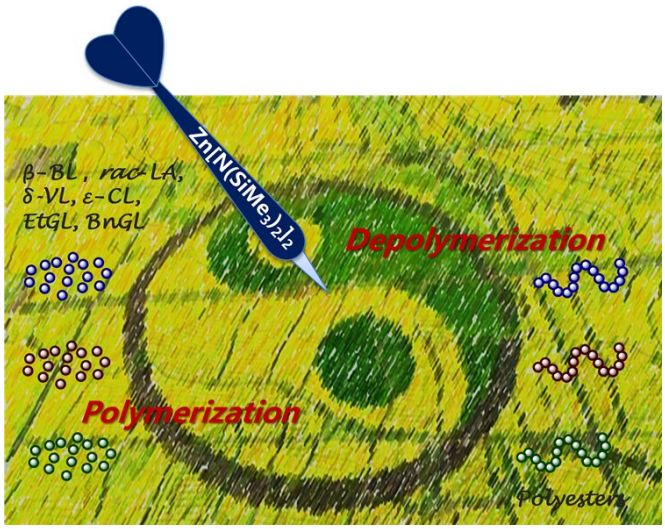
Scientists fabricate versatile catalyst for polyester synthesis and degradation

11 December 2020, by Li Yuan



Zn(HMDS)2 as a versatile transesterification catalyst for polyesters synthesis and degradation. Credit: XU Guangqiang

White pollution from discarded plastic waste is one of the most urgent environmental problems facing human beings. With the rapid development of science and technology and the increasing awareness of environmental protection, degradable green functional materials are of great demanding.

Aliphatic polyester materials generated by ring-opening polymerization of lactone monomers are the ideal candidates. They have good biocompatibility and biodegradability with comparable mechanical properties to fossil based plastics.

Recently, a research group led by Prof. Wang Qinggang from the Qingdao Institute of Bioenergy and Bioprocess Technology of the Chinese Academy of Sciences reported a new catalytic approach that affords controlled polymerizations of lactones and efficient depolymerizations of polyesters.

In the presence of alcohol initiator, this catalytic system exhibits excellent catalytic activity for various lactones polymerization, including rac-lactide, ?-caprolactone, ?-valerolactone, etc.

The researchers observed "chain transfer" products from microstructural analysis, indicating that this catalystic systerm could also catalyze the depolymerization potentially. By changing reaction conditions, efficient depolymerizations to valuable small molecules could be achieved under mild conditions, to fulfill the green and sustainable economy.

The study was published in *ACS Sustainable Chemistry & Engineering* on Dec.9.

More information: Rulin Yang et al. Zn(HMDS)2 as a Versatile Transesterification Catalyst for Polyesters Synthesis and Degradation toward a Circular Materials Economy Approach, *ACS Sustainable Chemistry & Engineering* (2020). DOI: 10.1021/acssuschemeng.0c07595

Provided by Chinese Academy of Sciences