

SEPTEMBER
23-27TH
2024

19TH BMO S

BRAZILIAN MEETING
ON ORGANIC SYNTHESIS
BENTO GONÇALVES, RS - BRAZIL

Ru-catalyzed Disconnection of C–O Bonds in Epoxy Resins

Gabriel M F Batista^{1*}, Alexander Ahrens¹, Andreas Bonde¹, Hans Christian D. Hammershøj¹, Emil Vincent Schwibinger¹, Ainara Nova², Troels Skrydstrup¹

1) Department of Chemistry and Interdisciplinary Nanoscience Center (iNANO), Aarhus University, Denmark

2) Department of Chemistry, Hylleraas Centre for Quantum Molecular Sciences, University of Oslo, Norway

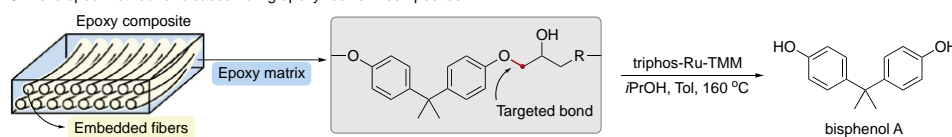
*e-mail: gmbf@inano.au.dk

Keywords: Epoxy resins, Ruthenium, Catalytic depolymerization.

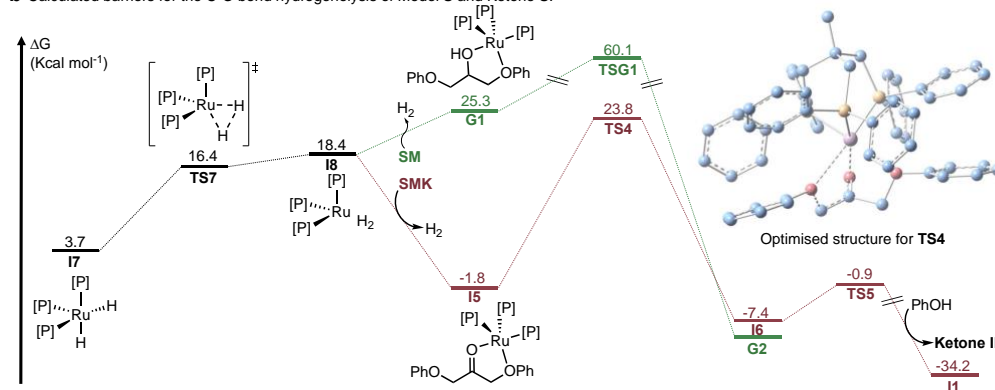
ABSTRACT

Epoxy resins, when combined with carbon or glass fibers, form lightweight, inert, high-performance composites extensively used in the marine, aerospace, automotive, and wind turbine industries.^{1,2,3} To date, there are no industrial closed-loop recycling technologies for this thermoset polymer, leading to landfilling and incineration as primary disposal methods.^{1,2,3} Innovative chemical recycling and depolymerization strategies are needed to recover monomers from end-of-life thermoset plastics, making these materials sustainable.^{1,2,3} In 2023, we published the first process capable of disassembling epoxy resins in composites, liberating intact glass fibers, and recovering bisphenol A, a key component of the epoxy polymer.⁴ This was followed by a detailed mechanistic investigation of this catalytic disassembly process, which has been recently published.⁵

a Developed method for disassembling epoxy resins in composites



b Calculated barriers for the C–O bond hydrogenolysis of Model S and Ketone S.



ACKNOWLEDGEMENTS

Financial support by Innovation Fund Denmark (Grant 0224-00072B), Danish National Research Foundation (Grant No. DNRF118 and DNRF-93), the Novo Nordisk Foundation (grant no. NNF21SA0072700), Aarhus University, European Union's Horizon 2020 research and innovation program under grant agreement N° 862179 and Marie Skłodowska-Curie grant agreement N° 859910, CSCAA and the Research Council of Norway through the Centre of Excellence (No. 262695), FRIPRO project (No. 314321), and the Norwegian Metacenter for Computational Science (NOTUR) for computational resources (project number nn4654k). This publication reflects the views only of the authors, and the commission cannot be held responsible for any use which may be made of the information contained therein. We are deeply grateful to Heraeus Precious Metals, who supported this study by providing ruthenium precursors.

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<https://doi.org/10.1038/s41467-024-50083-9>