48ª Reunião Anual da Sociedade Brasileira de Química

Emergências Climáticas?
A Química Age e Reage!

ANAIS

08 a 11 de junho de 2025, Campinas, Expo Dom Pedro

Revisão textual e gramatical: Resposanbilidade dos respectivos autores.

Dados Internacionais de Catalogação na Publicação (CIP)
(Câmara Brasileira do Livro, SP, Brasil)

Reunião Anual da SBQ (48. : 2025 : Campinas, SP)
Anais da 48ª Reunião Anual da SBQ [livro eletrônico] / Sociedade Brasileira de Química. -- 1. ed. -- Campinas, SP : Aptor Software, 2025.
PDF

Vários autores.
Vários colaboradores.
Bibliografia.
ISBN 978-85-63273-70-3

1. Química I. Sociedade Brasileira de Química. II. Título.

25-282696 CDD-540

Índices para catálogo sistemático:

1. Química 540

Eliete Marques da Silva - Bibliotecária - CRB-8/9380

Área: MAT

Valorization of CO_2: Catalytic Conversion of Styrene Oxide to Cyclic Carbonates with Rosin-Based Metal Complexes

Gilbert Bannach (PQ),[1]* Caroline Gaglieri[1], (PQ), Rafael T. Alarcon[2] (PQ), Aniele de Moura (PQ)[2], Gabriel I. dos Santos (IC)[1], Fernanda B. dos Santos (IC)[1], Sabrina M. Moreno (IC)[1]

gilbert.bannach@unesp.br

[1]São Paulo State University (Unesp), School of Sciences, Department of Chemistry, 17033-260, Bauru, SP, Brazil; [2]Universidade de São Paulo-USP, Instituto de Química de São Carlos, 13566-590, São Carlos, SP, Brazil.

Keywords: *Polymers, Rosin Gum, Carbonatation Reaction, Carbonated monomers, CO_2 fixation*

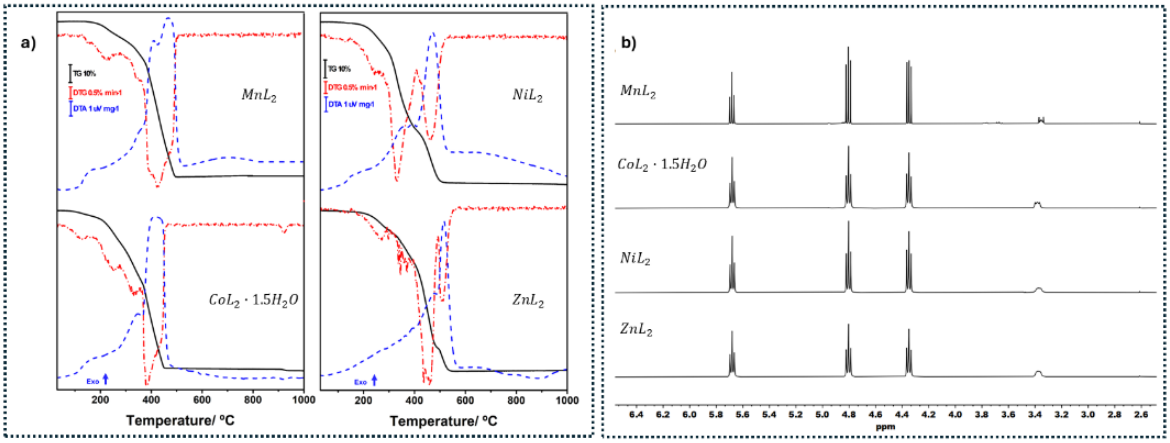
Highlights

A new class of heterogeneous catalysts from renewable gum rosin is introduced for CO_2 conversion, addressing the challenge of sustainable catalyst development in this field.

Resumo/Abstract

Carbon dioxide (CO2) is a naturally occurring molecule, but its atmospheric concentration has risen dramatically since the Industrial Revolution. Carbon Capture and Storage (CCS) and Carbon Capture and Utilization (CCU) are promising solutions to mitigate this increase [1]. CCU is particularly compelling from a chemistry standpoint, as it treats CO2 as a feedstock for materials synthesis. The use of CO2 to produce carbonated monomers and subsequently polymers is therefore an area of significant interest. A key challenge in this field is the development of heterogeneous catalysts derived from renewable sources. In this work, we synthesized a series of metal complexes using rosin acids (gum rosin, used without prior purification) as ligands. The stoichiometries of these complexes, determined from mass losses observed in thermogravimetric analysis (TG/DTG-DTA curves shown in Figure 1), were then evaluated as catalysts. Following established literature procedures [2], we tested their catalytic activity in the conversion of styrene oxide to cyclic carbonates. All catalytic systems demonstrated high conversion rates, exceeding 85.0%, as determined by 1H-NMR spectroscopy (Figure 2b).

Figure 1. ***(a)*** TG/DTG-DTA curves and proposed stoichiometries for rosin-derived metal complexes. ***(b)*** 1H-NMR spectra of the cyclic carbonate products from the catalytic carbonatation reaction.



References:
[1] L. Guo, KJ. Lamb, M North. Green Chem. (2021) 23, 77-118;
[2] RT. Alarcon. *et. al.* J App. Polym. Sci. (2023) 140, e53962.

Agradecimentos/Acknowledgments

São Paulo Research Foundation (FAPESP, grants: 2024/00779-2, 2023/14645-5, 2024/03936-1 and 2024/14279-1), and National Council for Scientific and Technological Development (CNPq, grants: 303247/2021-5).