Anais

XXIV Simpósio Brasileiro de

ELETROQUÍMICA & ELETROANALÍTICA

Sociedade Brasileira de Eletroquímica e Eletrocatálise
SBEE

UNISINOS
DESAFIE O AMANHÃ.

PPGAD
Programa de Pós-Graduação em Ambiente e Desenvolvimento

UNIVATES

Simone Stülp
Tatiana Rocha
Leandro Machado de Carvalho
Daniel Ricardo Arsand
Daiane Dias
Pedro Hernandez Jr.
Fernanda Trombetta
Alexandre Schneider
(Orgs.)

Anais do XXIV Simpósio Brasileiro de Eletroquímica e Eletroanalítica

1ª edição

EDITORA
UNIVATES

Lajeado/RS, 2024

ISBN 978-85-8167-307-3

Universidade do Vale do Taquari - Univates
Reitora: Profa. Ma. Evania Schneider
Vice-Reitora e Pró-Reitora de Ensino: Profa. Dra. Fernanda Storck Pinheiro
Pró-Reitor de Pesquisa e Pós-Graduação: Prof. Dr. Carlos Cândido da Silva Cyrne

EDITORA UNIVATES

Editora Univates
Coordenação: Prof. Dr. Carlos Cândido da Silva Cyrne
Editoração: Marlon Alceu Cristófoli

Avelino Talini, 171 – Bairro Universitário – Lajeado – RS, Brasil
Fone: (51) 3714-7024 / Fone: (51) 3714-7000, R.: 5984
editora@univates.br / http://www.univates.br/editora

S612 Simpósio Brasileiro de Eletroquímica e Eletroanalítica (24. : 2023 : Lajeado, RS)

Anais do XXIV Simpósio Brasileiro de Eletroquímica e Eletroanalítica, 2 a 5 de outubro de 2023, Lajeado, RS [recurso eletrônico] / Simone Stülp et al. (org.) – Lajeado : Editora Univates, 2023.

Disponível em: www.univates.br/editora-univates/publicacao/413
ISBN 978-85-8167-307-3

1. Eletroquímica. 2. Eletroanalítica. 3. Anais. I. Stülp, Simone. II. Rocha, Tatiane. III. Carvalho, Leandro Machado de. IV. Arsand, Daniel Ricardo. V. Dias, Daiane. VI. Hernandez Jr., Pedro. VII. Trombetta, Fernanda. VIII. Schneider, Alexandre. IX. Título.

CDU: 543.55

Catalogação na publicação (CIP) – Biblioteca Univates
Bibliotecária Gigliola Casagrande – CRB 10/2798

ISBN 978-85-8167-307-3

Nome dos autores: Rafael Luiz Romano, Fabio Henrique Barros de Lima

Nome dos Apresentadores: Rafael Luiz Romano, Rafael Luiz Romano, Fabio Henrique Barros de Lima

Instituição de Ensino: Instituto de Química de São Carlos - Universidade de São Paulo - IQSC/USP

COPPER(II) COMPLEXES WITH WATER-INSOLUBLE LIGANDS AS ELECTROCATALYSTS FOR CARBON DIOXIDE REDUCTION TOWARDS C1 AND C2 PRODUCTS

Resumo: The growing energy demand has led to excessive emissions of carbon dioxide (CO_2) into the atmosphere, resulting in several environmental problems. In this context, electrochemical reduction of CO_2 (CO_2R) emerges as a promising process that can both contribute to reduce net CO_2 emissions and be an alternative/ sustainable method to produce valuable chemicals. However, there are some factors that limit the use of CO_2R in large scale, including high overpotentials and poor selectivity.[1] Thus, efforts have been made towards the development of more active, selective and stable electrocatalysts. Copper was shown to be the only pure metal able to promote the electrochemical reduction of CO_2 to hydrocarbons. [1] Due to this unique property, several copper-based electrocatalysts have been studied during the past few decades. Many copper complexes exhibited good activity towards CO_2R and it was shown that most of them experience restructuring processes under CO_2R conditions, affecting activity and selectivity. Additionally, there are some important evidences concerning the reversible restructuring,[2] which can be an interesting approach to reach higher stability. In this study, the activity, selectivity and stability of different copper complexes for CO_2R were investigated. Both [Cu(bzimpy)Cl_2] and [Cu(pyrben)(NO_3)](NO_3) were considered, where *bzimpy* and *pyrben* stand for 2,6-bis(2- benzimidazolyl)pyridine and 2-(2-pyridyl)benzimidazole, respectively. The products distribution was monitored by on-line EC-MS (Electrochemistry Coupled to Mass Spectrometry) and the quantification was made by Gas Chromatography. Briefly, the results showed that both complexes were active for CO_2R and a faradaic efficiency of 31% towards ethylene was obtained with the [Cu(bzimpy)Cl_2] at -1.24 V *vs.* RHE. Besides, this material showed higher stability than [Cu(pyrben) (NO_3)](NO_3) after polarizations in high positive potentials (0.96 V *vs.* RHE).

Agradecimento: R.L.R. and F.H.B.L. acknowledge São Paulo Research Foundation (FAPESP) for the scholarships (grant #2021/03263-9) and financial support (grant #2019/22183-6). F.H.B.L. also acknowldges the support of RCGI-Shell, sponsored by FAPESP and Shell Brazil (grant #2020/15230-5).