

Accepted Manuscript

Research paper

Modifying the steric and electronic character within Re(I)-phenanthroline complexes for electrocatalytic CO₂ reduction

Bertrand J. Neyhouse, Travis A. White

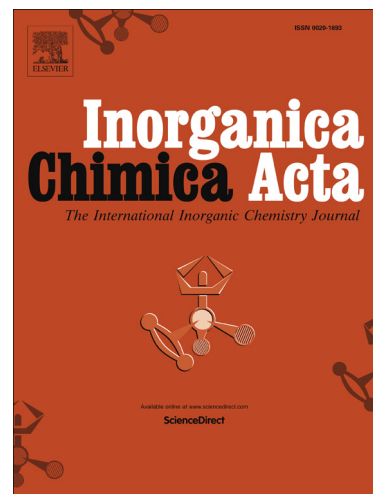
PII: S0020-1693(18)30066-5
DOI: <https://doi.org/10.1016/j.ica.2018.04.008>
Reference: ICA 18199

To appear in: *Inorganica Chimica Acta*

Received Date: 15 January 2018
Revised Date: 5 April 2018
Accepted Date: 6 April 2018

Please cite this article as: B.J. Neyhouse, T.A. White, Modifying the steric and electronic character within Re(I)-phenanthroline complexes for electrocatalytic CO₂ reduction, *Inorganica Chimica Acta* (2018), doi: <https://doi.org/10.1016/j.ica.2018.04.008>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Modifying the steric and electronic character within Re(I)-phenanthroline complexes for electrocatalytic CO₂ reduction

*Bertrand J. Neyhouse and Travis A. White**

Department of Chemistry and Biochemistry, Clippinger Laboratories, Ohio

University, Athens, Ohio 45701, United States

Abstract: We have synthesized and characterized a series of *fac*-[Re(R₂phen)(CO)₃Cl] complexes (R₂phen = 2,9-disubstituted-1,10-phenanthroline) that function as electrocatalysts for the reduction of CO₂ to CO. The 2,9-disubstituted phenanthroline ligands contain proton (**phen**), methyl (**2,9-Me₂phen**), trimethylphenyl (**Mes₂phen**), or trimethoxyphenyl (**(2,4,6-tmp)₂phen** and **(3,4,5-tmp)₂phen**) groups as steric and electronic modifiers to provide insight into factors impacting catalytic activity. Cyclic voltammograms (CVs) recorded in CO₂-saturated CH₃CN or DMF solutions reveal that following two-electron reduction and chloride dissociation to form the active [Re(R₂phen)(CO)₃]⁻ intermediate, current enhancement indicative of CO₂ reduction to CO was observed and confirmed by controlled potential electrolysis (CPE). Using current enhancement values (i_{cat}/i_p , where i_{cat} and i_p are the current response under CO₂ and N₂, respectively) to estimate catalytic activity, it was observed that catalysts with more cathodic Re^{I/0} potentials displayed greater activity, in accord with an electronic effect driving catalysis.

Download English Version:

<https://daneshyari.com/en/article/7750375>

Download Persian Version:

<https://daneshyari.com/article/7750375>

[Daneshyari.com](https://daneshyari.com)