Electrochemically Generated Copper Carbonyl for Selective Dimethyl Carbonate Synthesis
- DTU Orbit (25/02/2019)

Electrochemically Generated Copper Carbonyl for Selective Dimethyl Carbonate Synthesis

Development of electrochemical synthesis routes for high-value chemicals could pave the way for a sustainable chemical industry based on electricity. Herein, the electrochemical synthesis of the industrially relevant and environmentally benign reagent, dimethyl carbonate (DMC), is investigated. By utilizing a combination of electrochemical techniques, in situ infrared spectroscopy, and headspace-gas chromatography-mass spectrometry we show production and spectroelectrochemical evidence for the synthesis of DMC via an electrochemically generated copper carbonyl species. The formation of the copper carbonyl has close to 100% current efficiency, in the applied potential range of 0.1-0.4 V vs SCE. Subsequent formation of DMC occurs with a slow reaction time on the order of 30-40 days. Relative to potential coproducts, the reaction is highly selective for DMC. Optimization of the reaction may lead to a viable method of DMC production.

General information
State: Published
Organisations: Theoretical Atomic-scale Physics, Department of Physics, University of Copenhagen, Haldor Topsoe AS
Number of pages: 8
Pages: 859-866
Publication date: 2019
Peer-reviewed: Yes

Publication information
Journal: ACS Catalysis
Volume: 9
Issue number: 2
ISSN (Print): 2155-5435
Ratings:
BFI (2019): BFI-level 1
Web of Science (2019): Indexed yes
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 11.49 SJR 4.921 SNIP 2.113
Web of Science (2017): Impact factor 11.384
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 10.3 SJR 4.367 SNIP 2.081
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 9.88 SJR 3.973 SNIP 2.119
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 8.74 SJR 3.67 SNIP 2.02
Web of Science (2014): Impact factor 9.312
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 7.41 SJR 3.301 SNIP 1.848
Web of Science (2013): Impact factor 7.572
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
Scopus rating (2012): CiteScore 5.19 SJR 2.729 SNIP 1.619
Web of Science (2012): Impact factor 5.265
ISI indexed (2012): ISI indexed no
Web of Science (2012): Indexed yes