

Accepted Manuscript

Title: Electrochemical bicarbonate reduction in the presence of Diisopropylamine on silver oxide in alkaline sodium bicarbonate medium

Authors: Soraya Hosseini, Houyar Moghaddas, Salman Masoudi Soltani, Mohamed Kheireddine Aroua, Soorathep Kheawhom, Rozita Yusoff



PII: S2213-3437(18)30558-X
DOI: <https://doi.org/10.1016/j.jece.2018.09.025>
Reference: JECE 2646

To appear in:

Received date: 23-6-2018
Revised date: 10-9-2018
Accepted date: 16-9-2018

Please cite this article as: Hosseini S, Moghaddas H, Masoudi Soltani S, Kheireddine Aroua M, Kheawhom S, Yusoff R, Electrochemical bicarbonate reduction in the presence of Diisopropylamine on silver oxide in alkaline sodium bicarbonate medium, *Journal of Environmental Chemical Engineering* (2018), <https://doi.org/10.1016/j.jece.2018.09.025>

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.

Electrochemical bicarbonate reduction in the presence of Diisopropylamine on silver oxide in alkaline sodium bicarbonate medium

Soraya Hosseini^{a,*}, Houyar Moghaddas^b, Salman Masoudi Soltani^c,
Mohamed Kheireddine Aroua^d, Soorathep Kheawhom^a, Rozita Yusoff^e

^aComputational Process Engineering Research Laboratory, Department of Chemical Engineering, Faculty of Engineering, Chulalongkorn University, Bangkok 10330, Thailand

^bDepartment of Immunology and Physiology, Faculty of Arts and Science, University of Toronto, Ontario, Canada

^cDepartment of chemical Engineering, College of Engineering, Design and Physical Sciences, Brunel University London, London UB8 3PH, United Kingdom

^dCentre for Carbon Dioxide Capture and Utilization (CCDCU), School of Science and Technology, Sunway University, Bandar Sunway, 47500 Petaling Jaya, Malaysia

^eDepartment of Chemical Engineering, University of Malaya, 50603 Kuala Lumpur, Malaysia

*Corresponding author's Tel: +60176515750

*Corresponding author's e-mail: Soraya.H@Chula.ac.ir

Abstract:

In this study, the reduction of bicarbonate in the presence four amines on a silver oxide/carbon nanotube (Ag₂O/CNT) composite electrode has been investigated. The studied amines include ethanolamine (MEA), diethylenetriamine (DETA), diisopropylamine (DIPA) and aminoethylpiperazine (AEP). Regardless of amine type, in the absence of a bicarbonate solution, no reduction/oxidation peaks were observed. However, in the presence of bicarbonate, a single reduction peak along with simultaneous H₂ evolution was clearly observed. The cyclic voltammetry measurements showed that only diisopropylamine (DIPA) had a significant catalytic effect toward bicarbonate reduction on the composite electrode. No peak was observed in the anodic direction of the reverse scans, suggesting the irreversible nature of the electrochemical process. The effect of scan rate revealed that the irreversible reduction mechanism is governed by both diffusion and adsorption pathways. In addition of carbonate ions, formate ions also have been detected in liquid phase. In order to study the mechanism of bicarbonate reduction in the DIPA solution on Ag₂O/CNT electrode,

Download English Version:

<https://daneshyari.com/en/article/11028992>

Download Persian Version:

<https://daneshyari.com/article/11028992>

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