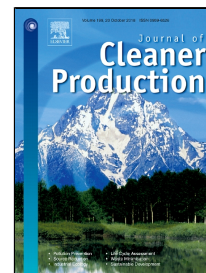


Accepted Manuscript

Group Contribution Methods for Estimating CO₂ Absorption Capacities of Imidazolium and Ammonium-based Polyionic Liquids

Mohammad Navid Kardani, Alireza Baghban, Jafar Sasanipour, Amir H. Mohammadi



PII: S0959-6526(18)32469-7
DOI: 10.1016/j.jclepro.2018.08.127
Reference: JCLP 13911
To appear in: *Journal of Cleaner Production*
Received Date: 05 December 2017
Accepted Date: 13 August 2018

Please cite this article as: Mohammad Navid Kardani, Alireza Baghban, Jafar Sasanipour, Amir H. Mohammadi, Group Contribution Methods for Estimating CO₂ Absorption Capacities of Imidazolium and Ammonium-based Polyionic Liquids, *Journal of Cleaner Production* (2018), doi: 10.1016/j.jclepro.2018.08.127

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.

Group Contribution Methods for Estimating CO₂ Absorption Capacities of Imidazolium and Ammonium-based Polyionic Liquids

Mohammad Navid Kardani ^a, Alireza Baghban ^{*,b}, Jafar Sasanipour ^c, Amir H Mohammadi ^{d,e,*}

^a Department of Petroleum Engineering, School of Chemical Engineering, University of Tehran, Tehran, Iran

^b Department of Chemical Engineering Amirkabir University of Technology (Tehran Polytechnic), Mahshahr Campus, Mahshahr, Iran

^c Department of Gas Engineering, Ahwaz Faculty of Petroleum Engineering, Petroleum University of Technology (PUT), Ahwaz, Iran

^d Institut de Recherche en Génie Chimique et Pétrolier (IRGCP), Paris Cedex, France

^e Discipline of Chemical Engineering, School of Engineering, University of KwaZulu-Natal, Howard College Campus, King George V Avenue, Durban 4041, South Africa

Abstract – In this work, modeling of CO₂ absorption in polyionic liquids has been studied utilizing radial basis function artificial neural network (RBFANN) and least square support vector machine (LSSVM) combined with group contribution method, RBFANN-GC and LSSVM-GC, respectively. A database comprised of 350 data points containing information for about 35 different polyionic liquids was employed to develop the proposed models. Temperature, pressure, and a number of chemical structures (from group contribution method) are the input parameters of the proposed models. Absorption of carbon dioxide in polyionic liquids is the models' output parameter reported in term of concentration. Outlier detection analysis was performed for both models to enhance the models' validity through the elimination of data points with considerable deviation from the majority of data points in the data base. Results are then compared to results of the previously reported methods, i.e. multi-layer perceptron artificial neural network (MLPANN) and adaptive neuro-fuzzy inference system (ANFIS). Error analyses indicate the great performance of both RBFANN-GC and LSSVM-GC in the estimation of CO₂ absorption in polyionic liquids. Average absolute relative average deviation percentage

* Corresponding author

E-mail: Alireza_baghban@alumni.ut.ac.ir and a.h.m@irgcp.fr & amir_h_mohammadi@yahoo.com

Download English Version:

<https://daneshyari.com/en/article/10142577>

Download Persian Version:

<https://daneshyari.com/article/10142577>

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