

# THE CANADIAN JOURNAL OF CHEMICAL ENGINEERING

JANUARY 2022

VOLUME 100 NUMBER 1

## Issue Highlights . . . . . 2

### Special Series

#### Experimental Methods in Chemical Engineering Editor's Choice

Experimental methods in chemical engineering: X-ray absorption spectroscopy—XAS, XANES, EXAFS . . . . . 3  
*Ana Iglesias-Juez, Gian Luca Chiarello, Gregory S. Patience and M. Olga Guerrero-Pérez*

### Articles

#### Environment, Renewable Resources, Green Processes

Oil fingerprint identification technology using a simplified set of biomarkers selected based on principal component difference . . . . . 23  
*Lujun Zhang, Fei Du, Yan Wang, Yingde Li, Chun Yang, Sensen Li, Xiaodong Huang and Chunyan Wang*

#### Industrial Applications of Chemical Engineering Principles

Internal cathodic protection to study the erosion-corrosion of AISI 1018 carbon steel . . . . . 35  
*Kasia McChesney, Michael Trask, Dakota Penner, Richard Evitts, Glyn Kennell, Ikechukwuka Oguocha and Akindele Odeshi*

The effect of monoethylene glycol on the stability of water-in-oil emulsions . . . . . 44  
*Danielle G. Queiroz, Carla M. F. da Silva, Mario Minale, Daniel Merino and Elizabete F. Lucas*

#### Process Control, Systems Engineering and Statistics

Chemical process fault diagnosis based on a combined deep learning method. . . . . 54  
*Yu Bao, Bo Wang, Pandeng Guo and Jingtao Wang*

Nonparametric manifold learning approach for improved process monitoring. . . . . 67  
*Ping Cui, Xuhong Wang and Yupu Yang*

Genetic-based multi-objective optimization of alkylation process by a hybrid model of statistical and artificial intelligence approaches . . . 90  
*Farimah Mahmoudian, Amin Hedayati Moghaddam and Seyed Mohammad Davachi*

## Reaction Engineering, Chemical Kinetics, and Catalysis

Enhancement of kinetic rates of CO<sub>2</sub> in aqueous solutions of piperazine and methyldiethanolamine with addition of sulfolane . . . . . 103  
*Abdelmouiz Ahmed, Amr Henni, Abdenacer Guibadj and Ahmed Hadjadj*

Alkoxy side-chain effects of acidic ionic liquids catalysts for the esterification of n-butyl butyrate . . . . . 125  
*Xiantao Feng, Qiannan Wang, Mengyang Wang and Liang Liu*

## Separation Processes

Highly selective solvent extraction of Zn(II) and Cr(III) with trioctylmethylammonium chloride ionic liquid. . . . . 131  
*Décio F. Alves-Lima, Carmina F. Rodrigues, Carolina T. Pinheiro, Licínio M. Gando-Ferreira, Margarida J. Quina and Abel G. Ferreira*

Optimizing membrane synthesis parameters via Taguchi method: An approach to prepare high performance mixed-matrix membranes for carbon capture applications. . . . . 143  
*Muhammad Ahmad, Muhammad Sarfraz, Mohammed Ba-Shammakh, Kashaf Naseer and Mirza A. Ahmed*

## Transport Phenomena, Fluid Dynamics and Thermodynamics

Synergistic effect of salt ions and water-soluble amphiphilic compounds of acidic crude oil on surface and interfacial tension . . . . . 156  
*Mohsen B. Horeh, Kamran Hassani, Behzad Rostami and Salman Ghorbanizadeh*

Mathematical modelling of hydrothermal performance for Kenics type static mixer using power law obeying fluids. . . . . 170  
*Joydeb Mukherjee and Aniruddha B. Pandit*

Particle image velocimetry (PIV) experimental investigation of flow structures and dynamics produced by a centripetal turbine . . . . . 187  
*Jie Jin and Ying Fan*

Prediction and analysis of thermal-hydraulic performance of tubes with teardrop dimples based on artificial neural networks . . . . . 202  
*Xiang-shu Lei, Jin-bo Li, Xin Qi and Ying-wen Liu*