

# Korean Journal of Chemical Engineering

January 2018  
Volume 35, Number 1

Korean J. Chem. Eng. 35(1) 1-302  
Print ISSN 0256-1115  
Online ISSN 1975-7220

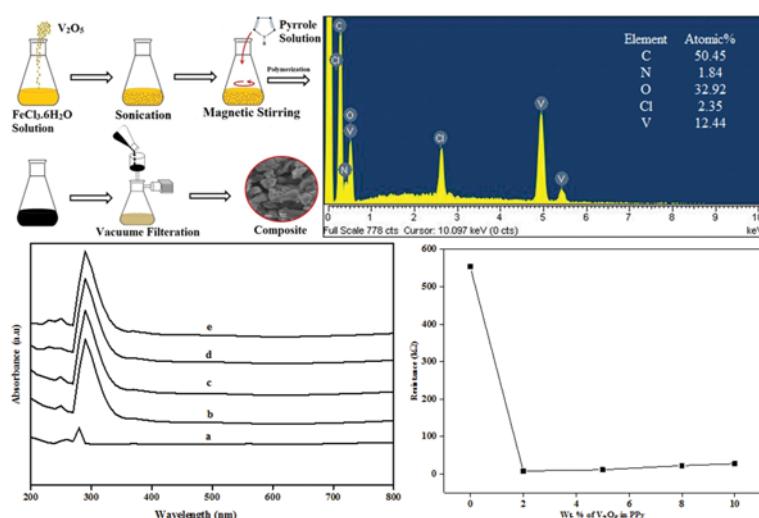
## INVITED REVIEW PAPER

Youngsik Lee, Jaemin Kim,  
Ja Hoon Koo, Tae-Ho Kim,  
and Dae-Hyeong Kim

### 1 Nanomaterials for bioelectronics and integrated medical systems

Khan Malook, Hamayun Khan,  
Mutabar Shah, and Ihsan-Ul-Haque

### 12 Synthesis, characterization and electrical properties of polypyrrole/V<sub>2</sub>O<sub>5</sub> composites



## PROCESS SYSTEMS ENGINEERING, PROCESS SAFETY

Yongheon Cho, Soojin Kwon,  
and Sungwon Hwang

### 20 A new approach to developing a conceptual topside process design for an offshore platform

## TRANSPORT PHENOMENA

Hamid Reza Karami, Masoud Rahimi,  
and Saeed Ovaysi

### 34 Degradation of drag reducing polymers in aqueous solutions

Mahshid Nategh, Shahriar Osfouri,  
and Reza Azin

### 44 Prediction of CO<sub>2</sub> mass transfer parameters to light oil in presence of surfactants and silica nanoparticles synthesized in cationic reverse micellar system

Hossein Kamran Haghghi,  
Mehdi Irannajad,  
and Davood Moradkhani

### 53 Permeation and modeling studies on Ge(IV) facilitated transport using trioctylamine through supported liquid membrane

Ao Pan, Minghui Xie, Jianye Xia,  
Ju Chu, and Yingping Zhuang

### 61 Gas-liquid mass transfer studies: The influence of single- and double-impeller configurations in stirred tanks

## CATALYSIS, REACTION ENGINEERING

EunGyoung Choi, KyoungHo Song,  
SoRa An, KwanYoung Lee,  
MinHyeh Youn, KiTae Park,  
SoonKwan Jeong, and HakJoo Kim

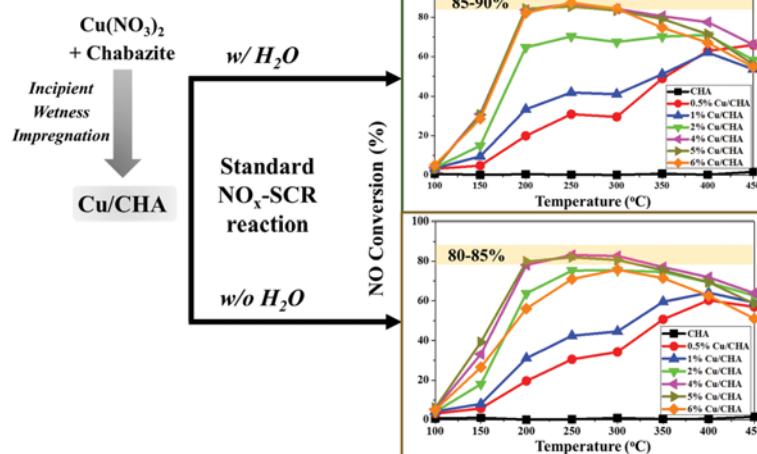
### 73 Cu/ZnO/AlOOH catalyst for methanol synthesis through CO<sub>2</sub> hydrogenation

Liwei Chen, Jumei Xu, Weilan Xue,  
and Zuoxiang Zeng

### 82 Mechanism and kinetics of esterification of adipic acid and ethylene glycol by tetrabutyl titanate catalyst

Nusnin Akter, Xianyin Chen,  
John Parise, Jorge Anibal Boscobonik,  
and Taejin Kim

- 89 Effects of copper loading on NH<sub>3</sub>-SCR and NO oxidation over Cu impregnated CHA zeolite



Lei Hu, Mei Yang, Ning Xu,  
Jiaxing Xu, Shouyong Zhou,  
Xiaozhong Chu, and Yijiang Zhao

- 99 Selective transformation of biomass-derived 5-hydroxymethylfurfural into 2,5-dihydroxymethylfuran via catalytic transfer hydrogenation over magnetic zirconium hydroxides

Wenze Li, Peng Lu, Ding Xu,  
and Kai Tao

- 110 CO<sub>2</sub> hydrogenation to methanol over Cu/ZnO catalysts synthesized via a facile solid-phase grinding process using oxalic acid

## ENERGY

Tae Young Kim, Beom Suk Kim,  
Tae Chang Park, and Yeong Koo Yeo

- 118 Model-based control of a molten carbonate fuel cell (MCFC) process

Marcin Stec, Andrzej Czaplicki,  
Grzegorz Tomaszewicz,  
and Krzysztof Słowiak

- 129 Effect of CO<sub>2</sub> addition on lignite gasification in a CFB reactor: A pilot-scale study

## ENVIRONMENTAL ENGINEERING

Qiang Liu, Ming Ke, Pei Yu, Feng Liu,  
Haiqiang Hu, and Changchun Li

- 137 High performance removal of methyl mercaptan on metal modified activated carbon

Subrata Mondal, Addisu Tadesse Derebe,  
and Kean Wang

- 147 Surface functionalized carbon microspheres for the recovery of copper ion from refinery wastewater

Kavita Kulkarni, Gajanan M. Bhogale,  
and Rujuta Nalawade

- 153 Adsorptive removal of fluoride from water samples using *Azospirillum* biofertilizer and lignite

Jin Li, Dan Wang, Deshuang Yu,  
and Peiyu Zhang

- 164 Performance and sludge characteristics of anammox process at moderate and low temperatures

## BIOTECHNOLOGY

Abdus Sobhan, Jun-Hyun Oh,  
Mi-Kyung Park, Seung Wook Kim,  
Chulhwan Park, and Jinyoung Lee

- 172 Single walled carbon nanotube based biosensor for detection of peanut allergy-inducing protein ara h1

Dan Li, Minsoo Kim, Hyunjin Kim,  
Okkyoung Choi, Byoung-In Sang,  
Pen Chi Chiang, and Hyunook Kim

- 179 Evaluation of relationship between biogas production and microbial communities in anaerobic co-digestion

Chih-Lun Cheng and Gui-Bing Hong

- 187 Optimization of extraction process for bioactive compounds from *Litsea cubeba* fruits

Chetan Joshi  
and Rekha Satishchandra Singhal

- 195 Zeaxanthin production by *Paracoccus zeaxanthinifaciens* ATCC 21588 in a lab-scale bubble column reactor: Artificial intelligence modelling for determination of optimal operational parameters and energy requirements

---

## SEPARATION TECHNOLOGY, THERMODYNAMICS

---

- Eun Hye Kim, Seong-Sik You, 204 **Effective separation of succinic acid by combined crystallization and Jeong Won Kang**
- Ji Yeon Lee and YoonKook Park 210 **Usage of a deep eutectic solvent based on three compounds for toluene separation**
- Sangwon Lee, Jay H. Lee, 214 **User-friendly graphical user interface software for ideal adsorbed solution theory calculations**  
and Jihan Kim
- Kyeong-Ho Lee and So-Jin Park 222 **Thermo-physical properties, excess and deviation properties for a mixture of  $\gamma$ -butyrolactone with diethyl carbonate or propylene carbonate**
- Rauf Foroutan, Reza Mohammadi, 234 **Treatment of chromium-laden aqueous solution using  $\text{CaCl}_2$ -modified *Sargassum oligocystum* biomass: Characteristics, equilibrium, kinetic, and thermodynamic studies**  
and Bahman Ramavandi

## MATERIALS (Organic, Inorganic, Electronic, Thin Films)

---

- Hong Tak Kim, Sung-Youp Lee, 246 **Effects of growth temperature on titanium carbide (TiC) film formation using low-frequency (60 Hz) plasma-enhanced chemical vapor deposition**  
Hyeong-Rag Lee, and Chinho Park
- Su-Jin Koo and Chang-Sik Ju 251 **Preparation of indium oxide from waste indium tin oxide targets by oxalic acid**
- Hwansu Sim, Jooyoung Lee, 257 **Manganese oxide with different composition and morphology as electrocatalyst for oxygen evolution reaction**  
Taekyung Yu, and Byungkwon Lim
- Choonghyun Sung 263 **Effect of assembly condition on the morphologies and temperature-triggered transformation of layer-by-layer microtubes**  
and Jodie L. Lutkenhaus
- Byeong Ho Min, Jae-Hwan Choi, 272 **Improvement of capacitive deionization performance via using a Tiron-grafted  $\text{TiO}_2$  nanoparticle layer on porous carbon electrode**  
and Kyeong Youl Jung
- Kyungmin Im, Hanseul Choi, 283 **Synthesis of Ni promoted molybdenum dioxide nanoparticles using solvothermal cracking process for catalytic partial oxidation of *n*-dodecane**  
Kye Sang Yoo, and Jinsoo Kim

## POLYMER, INDUSTRIAL CHEMISTRY

---

- Hamid Reza Ashjari, Arsalan Ahmadi, 289 **Synthesis and employment of PEGDA for fabrication of superhydrophilic PVDF/PEGDA electrospun nanofibrous membranes by in-situ visible photopolymerization**  
and Mir Saeed Seyed Dorraji
- Yajun Guo, Lihong Hu, Puyou Jia, 298 **Enhancement of thermal stability and chemical reactivity of phenolic resin ameliorated by nano $\text{SiO}_2$**   
Baofang Zhang, and Yonghong Zhou