

**Volume 02, Issue 19**

**2nd International Forum on Recent  
Advances in Management, E Commerce,  
Global Economy and Social Sciences  
(RMEG-MARCH-2019)**

**Tokyo Japan**

**March 23-24, 2019**



# **RMEG–Tokyo Japan**

2nd International Forum on Recent Advances in Management,  
E Commerce, Global Economy and Social Sciences

March 23-24, 2019

Hotel Mystays Ochanomizu Conference Center

**Book of abstracts**

**Volume 02, Issue 19**

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## **Organizing Committee**

- 1. Mr. Metin Gurani**  
*Conference Coordinator*
- 2. Ishida Otaki**  
*Conference Coordinator*
- 3. Hideo Owan**  
*Conference Coordinator*

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## **Conference Chair Message**

**Dr Masayuki Otaki**

International Conference on “2nd International Forum on Recent Advances in Management, E Commerce, Global Economy and Social Sciences” serves as platform that aims to help the scholarly community across nations to explore the critical role of multidisciplinary innovations for sustainability and growth of human societies. This conference provides opportunity to the academicians, practitioners, scientists, and scholars from across various disciplines to discuss avenues for interdisciplinary innovations and identify effective ways to address the challenges faced by our societies globally. The research ideas and studies that we received for this conference are very promising, unique, and impactful. I believe these studies have the potential to address key challenges in various sub-domains of social sciences and applied sciences.

I am really thankful to our honorable scientific and review committee for spending much of their time in reviewing the papers for this event. I am also thankful to all the participants for being here with us to create an environment of knowledge sharing and learning. We the scholars of this world belong to the elite educated class of this society and we owe a lot to return back to this society. Let’s break all the discriminating barriers and get free from all minor affiliations. Let’s contribute even a little or single step for betterment of society and welfare of humanity to bring prosperity, peace and harmony in this world. Stay blessed.

Thank you.

**Dr Masayuki Otaki**  
Conference Chair  
RMEG- Secretariat, 2019

# Conference Schedule

**DAY 01 Saturday (March 23, 2019)**

**Venue: Room 1**

9:00 am – 9:15 am	Welcome Reception & Registration
9:15 am – 9:30 am	Opening Ceremony
9:30 am – 9:40 am	Welcome Remarks –Conference Coordinator
9:40 am –9:50 am	Introduction of Participants
9:50 am – 9:55 am	Group Photo Session
9:55am – 10:00 am	Grand Networking Session and Tea Break



**DAY 01 Saturday (March 23, 2019)**

**Session 1 (10:00 am – 12:30 pm)**

**Venue: Room 1**

**Track A: Business, Economics, Social Sciences and Humanities**

<i>TKS-439-102</i>	Certification of Green goods and Export Policy	Li-Cheng Chen
<i>TKS-439-103</i>	The effect of customers' knowledge and employee service competencies on customer co-creation intention.	Yi-Hsuan Chen
<i>TKS-439-104</i>	The impact of customer-orientation on purchase intention: customer experience as a mediator	Jia-WenLi
<i>TKS-439-106</i>	The mediating effect of employee service innovation behavior between innovation climate and new service development	Yung Chun Hsieh
<i>TKS-439-107</i>	Trade policies, collusion and welfare	Chih-Yung Wang
<i>TKS-439-108</i>	Thailand stock return and gold future price	Mr. Watcharapon Wisedkul
<i>TKS-439-109</i>	The President's Party: An Essential Social Determinant of Health	Javier M. Rodriguez

**Track B: Engineering, Technology & Applied Sciences**

<i>TKE-439-101</i>	A Fault Diagnosis for Mechanical Reducer Gear-set Using Wigner-Ville Distribution and Artificial Neural Network	Jian-Da Wu
<i>DTETA-MARCH19-101</i>	Capacitive Deionization Performance of Doped MnO <sub>2</sub> /Carbon Black Composite Electrodes	Ms. Shu-Pin Li
<i>DTETA-MARCH19-102</i>	Enhanced Rare Metals Extraction by a Low-Pressure Microfiltration System Using Modified Cellulose Filter Paper	Ms. Lee, Yi-Jen
<i>DTETA-MARCH19-103</i>	Developing a Cyclic Breathing Lung Model for Pulmonary Drug Development	Ms. Hsiao, Yuan-Yuan

**Lunch Break 12-30 pm to 01-30 pm**

**DAY 01 Saturday (March 23, 2019)**

**Session 2 (01:30 pm – 3:00 pm)**

**Venue: Room 1**

**Track A: Business, Economics, Social Sciences and Humanities**

<b><i>RMEG-MARCH2019-106</i></b>	Cognitive informatics application in personal security systems	Marek R. Ogiela
<b><i>RMEG-MARCH2019-111</i></b>	Are mobile technology and moral aspect able to influence on recycling behavior? A new perspective of TPB theory	Mónica Clavel San Emeterio
<b><i>RMEG-MARCH2019-112</i></b>	Why tourists use Smartphones when shopping in destinations? A UTAUT2 application.	Emma Juaneda-Ayensa
<b><i>RMEG-MARCH2019-119</i></b>	Performance of the Warehouse Receipt System (WRS) Program to Support Agricultural Financing in Indonesia	Endro Gunawan
<b><i>RMEG-MARCH2019-123</i></b>	Shortcomings and Ambiguities in The Provisions and Applications of The Saudi Competition Law [2004]	Sara A. AlShehri

***Closing Ceremony***

### List of Conference Attendees

The following Scholars/ practitioners/educationist who don't have any paper presentation, however they will be attending the conference as delegates & observers.

<b>Sr. No</b>	<b>Official ID</b>	<b>Name</b>	<b>Affiliation Details</b>
<b>01</b>	<b>RMEG-MARCH2019-105A</b>	Dmitriy Rodionov	Institute of Industrial Management, Economics and Trade Peter the Great St.Petersburg Polytechnic University (SPbPU) Russia
<b>02</b>	<b>TKM-439-101A</b>	David Cheng, M.D.	Diagnostic Radiologist, USA
<b>03</b>	<b>TKM-439-102A</b>	Ghada Mohamad Ahmad Bedeir,	Al_ahmadi governorate, kuwait, Alhadeya, Kuwait

## DAY 02 Sunday (March 24, 2019)

### City History and Discussion Session

The purpose of the second day conference will be for the participants to learn more about the local history and culture, or get to know the other participants better. Therefore,

**Option 1:** City History and Culture Tour: All the participants are free to organize your own group tours together and get to know each other better.

**Option 2:** Discussion Session: All the participants are free to make group discussions on behalf of your same research interest and get a chance to cooperate in the future Research

**Track A: Business, Economics, Social Sciences and  
Humanities**

## Certification of Green goods and Export Policy

Dr. Ya-Po Yang<sup>1</sup>, Li-Cheng Chen<sup>2\*</sup>

**Abstract** This paper develops a two-country two-firm importing model to discuss the environmental quality standard policy of the importing country and the export policy of the exporting country. In the model, a foreign firm exports homogeneous goods to the domestic market and engages in Cournot competition with a domestic firm. Domestic government may require the imported products need to be certificated, and the exporting government implements export subsidy policies for the exporting goods. We find that: if domestic government require both goods needed to be certificated, then a higher export subsidy rate will lead to a higher quality standard, foreign firms' quantity, and a lower domestic firms' quantity, if domestic government does not require the importing goods needed to be certificated, then a higher export subsidy rate will lead to a higher foreign country's quality standard, foreign firms' quantity, and a lower domestic country's quality standard, domestic firms' quantity.

**Keywords:** Certification, Environmental, Homogeneous

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## **The effect of customers' knowledge and employee service competencies on customer co-creation intention.**

Yi-Hsuan Chen<sup>1</sup>, Yu-Chi Wu<sup>2\*</sup>

**Abstract** In the service industry, customers' knowledge is a critical asset for the company. Customer participation is the integration of customers into firm activities where they share needs- and solution-related inputs into the firm's new service development (NSD) processes that the firm may lack internally. However, there is currently a paucity of research on that customers may contribute to a firm's value by offering customers' knowledge. Moreover, very few empirical studies have investigated the effects of employees' service competencies on customer co-creation intention. The interactions between employees and customers are viewed as a critical part of every transaction. And the innovative potential of an organization resides in the knowledge and skills, both employees and leaders. Customers may contribute to a firm's value by offering their knowledge but also through product purchases and indirect ripple effects from customer engagement. The purpose of the current study is to explore whether the customer knowledge sharing intention will moderate the relationship among employee and customers' ability and co-creation intention or not. The findings may provide suggestions for selecting quality of first line employees (FLEs) and directions for training. Managers can become more equipped to identify and focus on what ability customers should have to enhance customer intention to share knowledge.

**Keywords:** Customers' knowledge, Customer co-creation intention, Employee service competencies, Knowledge sharing intention.

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# The impact of customer-orientation on purchase intention: customer experience as a mediator

Yu-Chi Wu<sup>1</sup>, Jia-WenLi<sup>2\*</sup>

**Abstract** Customer-oriented attitude likely reflects service employees' underlying value of concern for others, including customers. Therefore, service employees should be motivated to develop a strong commitment to concern for others if they perceive that their organization emphasizes mutual respect, appreciation, and cooperation. This study discusses enterprises to meet customer needs and increase customer value as the starting point of business operations. The purpose of this study tries to explore whether customer-orientation will affect customer experience, and which in turn will affect purchase intention. To develop a comprehensive research framework to integrate the interrelationships among customer-orientation, customer experience and purchase intention. Survey data will be gathered from the International Travel Fair in Southern Taiwan. Researchers intercept participants at the fair using a survey near the exit. This study provides a framework to address the above issue; this is done toward providing a deeper understanding of how customer purchase intention increases within a FLE customer-orientation behavioral context. The findings of this study benefit both researchers and practitioners, as they reveal a previously unidentified mediator (i.e., customer experiences) associated with the relationship between FLE customer-orientation behavior and customer purchase intention.

**Keywords:** Customer Orientation, Customer Experience, Purchase Intention

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# **The Mediating effect of employee service innovation behavior between innovation climate and new service development**

Yu-Chi Wu<sup>1</sup>, Yung-Chun Hsieh<sup>2\*</sup>

**Abstract** The ability to continuously offer customers with high-quality services is crucial for firms in the industry. To foster high-quality services for customers, employees represent the important linchpin for innovative service implementation. Employees can help to improve business performance through their ability to generate ideas and use these as building blocks for new and better products, services and work processes. The purpose of this study is to investigate whether employee service innovation behavior plays a mediating role between organization support climate for innovation and new service development. Theoretically, this study may provide an explanation for how an organization's perceived innovation culture may affect the development of new services by proposing a mediator (i.e., employee innovation behaviors). Practically, this study may fill the gap in the existing tourism literatures about the service innovation issues, because very few literature is related with service innovation and focuses on tourism industry.

**Keywords:** Organizational Support Climate for Innovation, Employees Service Innovation Behaviors, New Service Development

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## Trade policies, collusion and welfare

Dr. Ya-Po Yang<sup>1</sup>, Chih-Yung Wang<sup>2\*</sup>

**Abstract** This paper establishes a three-country and two-firm model ala Brander and Spencer (1985a) to explore the impact on the welfare of the relevant countries when exporting governments may adopt collusive export policies. In the model, two foreign firms produce homogeneous products and simultaneously export to the domestic market for Cournot competition. The domestic government imposes an uniform tariff or differential tariffs on imported products, and the two exporting governments adopt collusive or competitive export subsidy for their exporters. We find that the two export governments are less likely to collude when the import government implements uniform tariff policy than when he implements different tariff and when he adopts free trade policy, therefore, it may happen that uniform tariff policy leads to a higher consumer surplus in the domestic market than free trade policy.

**Keywords:** Trade Policies, Establishes, Welfare

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## Thailand stock return and gold future price

Mr. Watcharapon Wisedkul\*

**Abstract** This paper uses the multivariate GARCH model to answer three objectives. Our first objective is to examine the return and volatility transmission between gold and stock markets in Thailand. Second objective to compute and analyze the optimal weights and hedge ratios for gold-stock portfolio holdings. Third objective to find the diversification and hedging effectiveness of gold in Thailand based on different competing multivariate GARCH-based models. It contains of CCC-GARCH, DCC-GARCH, BEKK-GARCH models. We use three models for comparison the best result. The study used the daily data from August 2010 to August 2018. Our results show evidence of significant return and volatility cross effects between gold prices and stock prices in Thailand. Finally, our portfolio analysis show that adding gold to a portfolio of Thailand stocks improves its risk-adjusted return and helps to effectively hedge against stock risk exposure over time.

**Keywords:** Transmission, Optimal, Objective

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## **The President's Party: An Essential Social Determinant of Health**

Javier M. Rodriguez\*

**Abstract** It is hypothesized that variation in infant mortality rates in the United States is linked to the party that controls the presidency and the political ideology of the president. Data to test this hypothesis are from various sources including the Department of Health and Human Services and the Census Bureau, and extend from 1965 to 2010. Various statistical analyses show that, net of trend, national infant mortality rates, as well as for white and black people, decrease under Democratic administrations and increase under Republican administrations. Variations in low birthweight and preterm birth, which are known to precede infant mortality, are also related to the president's party and the political ideology of the president. The different policy preferences of Democratic and Republican presidents show to be one of the most influential factors impacting persistent infant mortality rate disparities between blacks and whites and the underperformance of the American health system at reducing infant mortality compared to other world nations and territories.

**Keywords:** Determinant, Essential, Ideology

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## **Are Mobile technology and moral aspect able to influence on recycling behavior? A new perspective of TPB theory**

Mónica Clavel San Emeterio \*

**Abstract** In waste management, technological advances are part of the equation but the other part is decision-making process in human behavior. The decision to recycle is a complex decision involving many constraints. Results of previous investigations show that people are conditioned when recycling due to factors such as the convenience of available recycling infrastructures, recycling programs, awareness of the importance of recycling, knowledge and environmental concern, type and area of residence, perceived social pressure, legislation, attitudes toward recycling, promotional campaigns among others. While a number of studies have explored recycling through the Theory of Planned Behavior (TPB) framework, we extend the schema interpretation by introducing the variable acceptance and use of technology (model UTAUT2), as well as a greater incidence on moral aspects. Being aware of the importance of the use given to the mobile technology, we must consider the perspective of "customers" in order to define an appropriate waste management system and how the use of technology is able to promote a more active and efficient recycling behavior. Regarding recycling, the impact of morale on behavior as a mediating variable has not been proven empirically. Available studies have analyzed the direct effects and have focused on the existence or not of discriminant validity between 'moral norms' and 'attitude', with divergent results. The objective of this work is to define a model to evaluate the impact on the recycling intention and behavior in light of one of the most influential psychological theories, the TPB, considering moral and use of technology as key aspect to promote this behavior.

**Keywords:** Technology, Complex, Equation

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# Performance of the Warehouse Receipt System (WRS) Program to Support Agricultural Financing in Indonesia

Endro Gunawan<sup>1</sup>, Yuli Edi Subagio<sup>2\*</sup>

**Abstract** The common problem in agricultural commodity in Indonesia is price volatility. The warehouse receipt system (WRS) is one of the means by which the farmers can manage the price volatility and finance their production activities. The warehouse receipt system has been implemented in Indonesia in 2006 based on Law No. 9 of 2006. As a new financial system, warehouse receipt system is not well known and not fully understood by stakeholders. This study examined the performance and benefit of the warehouse receipt system support the agricultural financing in Indonesia. The performance indicators measured in this study are number of volume and value of commodity deposit in the WRS, the number of warehouse receipt, and the number of financial funding from the WRS from 2008-2016. The method of analysis is narrative and descriptive statistic. The result revealed that since the WRS was introduced in 2006 in West Java and East Java province, until 2016 the WRS has been adopted in 76 districts/cities in 21 provinces. The warehouse receipt issued reached 2,423 receipts in 2016 with total volume of commodity of 87,868.77 tons valued at Rp. 493.2 billion, and Rp 291.3 billion was financed by the various financial institutions. The volumes of commodities stored in the warehouses over the period 2008 – 2016 were as follows: 73,026.16 tons of paddy rice valued at Rp 372.8 billion, 7,922.10 tons of rice (Rp 60 billion), 5,699.07 tons of corn (Rp 19.2 billion), 631.57 tons of coffee (Rp 36.6 billion), 555.57 tons of seaweeds (Rp 4.3 billion), 3.14 tons of cocoa (Rp 78.5 Million), 31.16 tons of rattan (Rp 264.5 Million). The benefit of the WRS is provides easy access to credit, controlling and stabilizing the commodity prices. For the banks, the WRS will create a market for banks' credit. The processor of agricultural products will ensure the availability of raw materials. The WRS is an alternative for the agricultural financing with the guarantee of warehouse receipt for credit collateral.

**Keywords:** Warehouse Receipt System, Agricultural Financing, Indonesia

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## **Shortcomings and Ambiguities in The Provisions and Applications of the Saudi Competition Law [2004]**

Sara A. AlShehri\*

**Abstract** On 22 June 2004, the Saudi government adopted its first comprehensive competition law named as ‘Competition Law’. The application of such law has some notable accomplishments despite the newness adoption of it within the Saudi community. However, with the increase of trading in the Saudi market, competition law faces legal and economic challenges that hinder its application and ability to detect anti-competitive practices. This study aims to present possible solutions that can help improve the Saudi Competition law and clarify the ambiguity of its enforcement. Also, to investigate the reasons behind any shortcomings within the law, and the extent in which they have affected the market. In addition, the study discusses the possible solutions to improve the law. The study approach is to employ both critical and comparative analyses of the shortcoming issues, with the usage of relatable cases from Saudi and European jurisdictions. The final analysis indicates that the lack of enforcement efficiency and independency can be mainly the reason causing such ambiguity in the law. Therefore, the study suggests that the implementation of the EU Commission experience can help greatly in enhancing the Saudi enforcement performance, and evidently can improve the competition practices within the Saudi community.

**Keywords:** Shortcomings, Ambiguities, Provision

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# Cognitive informatics application in personal security systems

Marek R. Ogiela<sup>1\*</sup>, Lidia Ogiela<sup>2</sup>

**Abstract** In this paper will be described possible applications of cognitive informatics solutions for security purposes and cryptographic procedures. In particular, will be presented the ways of using information systems and personal, individual characteristics for creation of secure protocols, oriented on distribution and secure management of information in Big Data repositories. The new paradigm of cognitive cryptography will be also described.

**Keywords:** Security Application, Cognitive Information Systems, Authentication Protocols

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## Why tourists use Smartphones when shopping in destinations? A UTAUT2 application.

Emma Juaneda-Ayensa \*

**Abstract** Smartphones have become a precious tool providing advice and information in everyday activities. When doing shopping, they become a main source to obtain data providing certainty in our decisions, as tourists, the aid provided by smartphones is even higher since it turns into the most accessible shopping guide. Tourist shopping is a key issue for enterprises, shops, countries and researchers due to its increasing relevance in the tourist experience as well as its significant revenues for destinations. Smartphones are a new element in the shopping process of tourists, affecting the shopping experience. In spite of the fact that understanding the intention to use smartphones by tourists is crucial, there is a lack of studies in this matter. This work explains the intention to use smartphones in tourist shopping in a sample of 986 tourists applying UTAUT2. Results have been analyzed with variance-based structural equation modelling (PLS). The model has a R2 of 0.72 and a predictive capacity Q2 of 0.63. The variable that most explains the intention to use smartphones in tourist shopping is the habit, followed by effort expectancy and performance expectancy. Results contribute to advance in the shopping tourist behavior comprehension and to help destinations in their offer of better experiences taking into account the smartphone as an element employed in the shopping process.

**Keywords:** Smartphones, Element, Destinations

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**Track B: Engineering and Technology,  
Computer, Basics and Applied Sciences**

# A Fault Diagnosis for Mechanical Reducer Gear-set Using Wigner-Ville Distribution and Artificial Neural Network

Jian-Da Wu<sup>1\*</sup>, Li-Hung Fang<sup>2</sup>

**Abstract** This paper describes a fault diagnosis system for mechanical reducers gear-sets using Wigner-Ville distribution and artificial neural network techniques. Reducer gear-sets are used in a variety of traditional and modern industries. In the production of the reducer, the vibration and noise signals of gear-set are usually used to determine the defective products or defective positions. Unfortunately, conventional fault diagnosis by human the performance is limited and no numerical standard. In the present study, the vibration signal of gear-set is used to evaluate the proposed fault diagnosis technique. In the experimental work, the features extraction by Wigner-Ville distribution is proposed for analyzing fault signals in reducer gear-set platform. The artificial neural network techniques both using general regression neural network and conventional back-propagation network are compared in the system. The experimental results pointed out the vibration can be used to monitor the condition of the gear-set platform and the general regression neural network has better recognition rate and less recognition time than back-propagation neural network.

**Keywords:** Mechanical vibration; Fault diagnosis; Back-propagation neural network; General regression neural network.

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# Enhanced Rare Metals Extraction by a Low-Pressure Microfiltration System Using Modified Cellulose Filter Paper

Ms. Lee<sup>1</sup>, Yi-Jen<sup>2</sup>, Wang Tsing-Hai<sup>3</sup>, Wang Chu-Fang<sup>4</sup>

**Abstract** Rare metals are valuable elements with wide applications but among all available techniques in hand, operation cost would be a major issue of concern as the concentration of rare metals in seawater is always in the level of several ppm to ppb. In this study, we adopted a low-pressure microfiltration system that could separate elements in ppb to ppm level under ambient pressure. The system has advantages of low energy consumption, easy operation and high efficiency (>95%). This was achieved by etherification of cellulose filter paper in which the associated carboxyl groups were responsible for the element separation. Operated at cross-flow mode, our results showed that the outlet concentration could be enriched to 114% relative to the initial concentration. Interestingly, the enrichment yield was found to be proportional to the formation constant of metal ions to carboxyl groups. Furthermore, depth profile analyses of used modified filter paper clearly indicated that a high content of extracted ions particularly enriched in the top half of the modified filter paper. This behavior implicated that the developed electrostatic interactions at filter paper/solution interface were likely the governing mechanism in separating metal ions. Based on these observations, therefore, we concluded that the charge of heavy metal ions, the formation constant of the associated carboxyl group to metal ions and initial concentration of solutions are three important factors affecting the extraction efficiency of modified filter paper. Further improvement of the efficiency of modified filter paper would be strongly relied on deep understanding regarding its surface chemistry.

**Keywords:** cellulose filter paper, membrane filtration, rare metals extraction.

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# Capacitive Deionization Performance of Doped MnO<sub>2</sub>/Carbon Black Composite Electrodes

Shu-Pin Li<sup>1</sup>, Su Xu<sup>2</sup>, Tsing-Hai Wang<sup>3\*</sup>, Chu-Fang Wang<sup>4</sup>

**Abstract** Capacitive deionization (CDI) is one of the promising technology for desalination and water purification in which the charged ions are removed from aqueous solutions by applied potential. In a CDI cell, electrode materials are a crucial component for enhancing desalination efficiency. In this study, we successfully fabricated Fe, Co, and Ni doped  $\alpha$ -manganese dioxide (MnO<sub>2</sub>)/carbon black (CB) composite electrodes. Factors including ratios of MnO<sub>2</sub>/CB composite, voltage, and concentration of solution were discussed and the morphology and structure of the prepared doped MnO<sub>2</sub>/CB composite were characterized by XRD, SEM, and XPS. Performance of the electrodes was studied by cyclic voltammetry, electrochemical impedance spectroscopy, and chronopotentiometry detecting from electrochemical station. A general pattern appears that CDI efficiency of doped high ratio (9.0 w/w) MnO<sub>2</sub>/CB decreased with increasing negative surface charge, which is likely attributed to the enhanced co-ion expulsion effect. Furthermore, material modification by manipulating its pKa1 and pKa2 values would be a promising strategy for further CDI efficiency enhancement. This is due to the fact that low degree surface charge density is important in electro-adsorption. Moreover, engineering structural stress by doped elements seems to be a practical route to modify the pKa1 and pKa2 values of MnO<sub>2</sub> and consequently improves the CDI efficiency.

**Keywords:** (2-3) Capacitive Deionization; MnO<sub>2</sub>; Carbon Black

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## Developing a Cyclic Breathing Lung Model for Pulmonary Drug Development

Ms. Hsiao, Yuan-Yuan<sup>1\*</sup>, Chun-Kai Lin<sup>2</sup>, Pulak Nath, Jen-Huang Huang<sup>3</sup>

**Abstract** Pulmonary administration is a non-invasive drug delivery method that can reduce the dosage of drugs and lower the side effects, compared to the systemic administration. To accelerate the development of the pulmonary drug, numerous testing models such as impingers and impactors are developed to evaluate the fate of the inhaled drugs. However, there are still some unknown factors, such as pulmonary morphology and breathing motion are required to be integrated to fully interpret the actual deposition profiles of the inhaled drugs in human respiratory tracts. Here, we develop a breathing lung model that integrates both branched morphology and deformable alveolar features using multi-layered fabrication technology to mimic the complex environment of the human respiratory tract. The model can emulate a cyclic breathing motion and spontaneously inhale and exhale the nebulized aerosols generated from the nebulizer under disease-like conditions. The results demonstrate that the aerosols (4.2  $\mu\text{m}$ ) can reach to the deeper lung (the 19th generation of the branched lung structure) in the obstructive-like model and penetrate less (the 17th generation) in the restrictive-like model. This breathing lung model can be served as a testing platform to provide an in-depth understanding of the pharmacokinetics of pulmonary drugs during drug development process. To simulate the real environment of human lung, we want to culture lung cells in lung device. Provide different types of particles (fly ash, soil and  $\text{TiO}_2$ ...) to be inhaled by the lung model and observe deposition of the particles.

**Keywords:** Lung device, Nebulized Aerosols.

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