

# (CETAS-2022)



**4th International Conference on Current  
Challenges in Engineering, Technology and  
Applied Sciences Research**

**The Howard Plaza Hotel Taipei, Taiwan**

**August 04-05, 2022**



**ESRDB**

# ***CONFERENCE BOOK OF ABSTRACT PROCEEDINGS***

***ESRDB***

Engineering Science Research & Development Board



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# **Book of Abstracts Proceedings**

**4th International Conference on Current Challenges in Engineering, Technology  
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***4th International Conference on Current Challenges in  
Engineering, Technology and Applied Sciences Research  
(CETAS-2022***

**Venue: The Howard Plaza Hotel Taipei, Taiwan**

**Conference Theme:** : Exchange of ideas and providing prime networking opportunities for engineering and technology education stakeholders.



## SCIENTIFIC COMMITTEE

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National Applied Research Laboratories, Taiwan

**Frank Hsia-San Shu**

National Tsing Hua University

**Ming-Hsiu Liu, Yuan Ze University**

Taoyuan, Taiwan (R.O.C)

**Chau, Chi Fai**

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Taiwan

**Assistant Professor Tsang**

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Universiti Tunku Abdul, Malaysia

## ORGANIZING COMMITTEE

**Ms Anne Li**

Conference Chair

**Email:** Anne.li@esrdb.com

**Mei Shu Lai, Professor Emeritus**

Conference Supervisor

**Email:** lai@esrdb.com

**Philip L-F. Liu**

Conference Supervisor

**Email:** liu@esrdb.com



## CONFERENCE TRACKS

- Basic Science
- ICT
- Electrical Engineering
- Mechanical & Industrial Engineering
- Civil Engineering
- Business and Management Studies
- Electric Drives and Control
- Electrical Machines
- Instrumentation Engineering
- Power Generation, Transmission and Distribution
- Power System Engineering

## CONFERENCE CHAIR MESSAGE

**Ms.Anee Lee**

“International Conference of Engineering Science Research and Development Board” is a platform that thrives to support the worldwide scholarly community to analyze the role played by the multidisciplinary innovations for the betterment of human societies. It also encourages academicians, practitioners, scientists, and scholars from various disciplines to come together and share their ideas about how they can make all the disciplines interact in an innovative way and to sort out the way to minimize the effect of challenges faced by the society. All the research work presented in this conference is truly exceptional, promising, and effective. These researches are designed to target the challenges that are faced by various sub-domains of the social sciences and applied sciences.

I would like to thank our honorable scientific and review committee for giving their precious time to the review process covering the papers presented in this conference. I am also highly obliged to the participants for being a part of our efforts to promote knowledge sharing and learning. We as scholars make an integral part of the leading educated class of the society that is responsible for benefitting the society with their knowledge. Let’s get over all sorts of discrimination and take a look at the wider picture. Let’s work together for the welfare of humanity for making the world a harmonious place to live and making it flourish in every aspect. Stay blessed.

Thank you.

Ms. Anee Lee

Conference Chair

Email: [contact@esrdb.com](mailto:contact@esrdb.com)



## CONFERENCE AGENDA

**Conference Name: 4th International Conference on Current Challenges in Engineering, Technology and Applied Sciences Research (CETAS-2022)**

**Day & Date: Thursday, August 04, 2022**

**Venue: The Howard Plaza Hotel Taipei**

### Timeline of Day 01

08:00 am - 08:05 am:	Registration & Kit Distribution
08:05 am - 08:10 am:	Introduction of Participants
08:10 am - 08:15 am:	Inauguration and Opening address
08:15 am - 08:20 am:	Grand Networking Session

**Tea/Coffee Break (08:20 am - 09:00 am)**

**DAY 01 Tuesday (August 04, 2022)**

**Presentation Session (09:00 am - 10:30 am)**

**Venue: Room 1**

**Track A: Engineering Technology and Applied Sciences**

<b>Paper ID</b>	<b>Manuscript Title</b>	<b>Presenter Name</b>
Ching-Hsuan Yen	Design and Application of Unloaded Flat Transformers With Spiral Coils	CETAS-AUG22-TW101
Hong-Ming Lin	The Pyrolysis Characteristics and Thermogravimetric Kinetic Analysis of the Pyrolysis of CIGS Nanocrystals	CETAS-AUG22-TW102
Sumon Md Shariful Islam	Improvement of output efficiency of a fuel cell by using Oxygen	CETAS-AUG22-TW104
Hirohisa Hirai	The Work-In-Process Valuation under the Process-Costing with FIFO	CETAS-AUG22-TW105

**Track B: Business, Economics, Social sciences & Humanities**

Pin-Hui Su	The Impact of Emotions Containing in Social Media Posts on User Responses - A Case Study of Taiwan Fan Page on Facebook	AEMHS-AUG22-117
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**Closing Ceremony**

## **Conference Day 02 (August 05, 2022)**

Second day of conference will be specified for touristy. Relevant expenses are borne by Individual him/herself.

***TRACK A***

***Engineering Technology and Applied Sciences***





# Design and Application of Unloaded Flat Transformers With Spiral Coils

<sup>1\*</sup>Ching-Hsuan Yen, <sup>2</sup>Cheng-Hung Lin, <sup>3</sup>Jium- Ming Lin

<sup>1,2,3</sup>Chung-Hua University, Taiwan

Corresponding Email: d10524002@chu.edu.tw

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**Keywords:** Flat transformer, Flexible Spiral, Spiral coils, transformer

The proposed transformer was designed with flexible spirals, which are similar to the design of the Archimedes spiral to achieve a thin transformer structure. Soft layered magnetic materials were produced by stacking two or more sets of spiral coils on a plane at a short distance from each other and using suitable spacer materials between these coil sets. Accordingly, an innovative, thin, flat, and flexible transformer was created, and its functionality was ensured. The specifications of the spiral coils were as follows: wire diameter = 20 mil, gap between turns = 20 mil, number of turns = 40, and thickness = 1 OZ. The transformer was designed with an one layer or two-layer structure for conducting experiments. Coils were stacked directly to change the coil ratio of the transformer. The substrate material was polyimide, which is flexible and can generate sound when interacting with magnets. The performance of the developed transformer was examined under two coil ratios: 1:1 and 1:2. Different types of magnetic materials were used between the coil sets to examine the effects of these materials on the transformer performance. Five settings (AE) were adopted in this study, and the optimal experimental results were obtained in Setting E, and the second-best results were obtained in Setting C. In Setting E, a silicon steel/primary coil/secondary coil/silicon steel structure was used, and the output voltage and current were 0.22 V and 12.6 mA, respectively, at a coil ratio of 1:1 as well as 0.49 V and 8.7 mA, respectively, at a coil ratio of 1:2. In Setting C, a magnet/primary coil/secondary coil/magnet structure was used, and the output voltage and current were 0.20 V and 9.27 mA, respectively, at a coil ratio of 1:1 as well as 0.46 V and 7.45 mA, respectively, at a coil ratio of 1:2. The experimental results revealed that the performance of a flat transformer is mainly affected by the spacing between the primary and secondary coils and not by the magnetic material between two coil sets. The secondary coils generate the maximum voltage and current when the primary and secondary coils are tightly fit together without any spacer material between them.

# The Pyrolysis Characteristics and Thermogravimetric Kinetic Analysis of the Pyrolysis of CIGS Nanocrystals

<sup>1\*</sup>Hong-Ming Lin, <sup>2</sup>Kai-Chung and Hsu,

<sup>3</sup>Jyh-Herng Chen

<sup>1,2,3</sup>National Taipei University of Technology, Taiwan

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**Keywords:** Thermal decomposition,  $\text{CuIn}_x\text{Ga}_{1-x}\text{Se}_2$ , Chalcopyrit

A kinetic of the thermo-oxidative decomposition of CIGS nanoparticles is investigated with a thermogravimetric analyzer with non-isothermal methods. The weight loss was measured by TGA in the air atmosphere. The samples were heated over a range of temperatures from 300 K to 1,100 K with three different heating rates of 2, 5, and  $10^0\text{C min}^{-1}$ . The results obtained from the thermal decomposition process indicate that there are two stages of thermal decomposition in the temperature range. The binary/ternary selenide is formed in the first stage. The invariant activation energy and frequency factor ( $\ln A$ ) in the first stage are 143.76 kJ/mol and 20.93 1/sec, respectively. In the second stage, the selenide begins to be oxidized to form a metal oxide. The invariant activation energy and frequency factor ( $\ln A$ ) in the second stage are 222.81 kJ/mol and 25.90 1/sec, respectively. The determined most probable  $g()$  functions are  $g()=(1-)^{-2-1}$  for both stage.

# Improvement of output efficiency of a fuel cell by using Oxygen

<sup>1\*</sup> Kazutaka Itako

<sup>2</sup>Sumon Md Shariful Islam

<sup>1,2</sup>Dept. of Electrical and Electronic Engineering, Kanagawa Institute of Technology,  
Japan.

Corresponding Email: itako@ele.kanagawa-it.ac.jp

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**Keywords:** Fuel cell, High efficiency, Increasing Output, Use of Oxygen in Fuel Cell, Polymer Electrolyte Membrane Fuel Cell (PEMFC).

In the era of this modern technology, fuel cell is the most effective and continuous power generation system. A fuel cell is a system where chemical energy is converted to electrical energy through an electrochemical reaction of hydrogen with an oxidizing agent such as oxygen. The author previously proposed the new PV generation system where surplus electric power is used for electrolysis of water to generate hydrogen, which is used to convert into electricity by fuel cell at nighttime or in the bad weather. In this system, oxygen is produced as a by-product in the process. Therefore, this paper investigates the use of this oxygen for the power generation, which makes the system more effective than the old system of fuel cell with the air. The experiment of using air and oxygen shows that when oxygen is used, fuel cell efficiency increases by 12% and the output power is increased twice as much as of air. The latest fuel cell technology, polymer electrolyte fuel cell (PEMFC) is used for conducting the whole experiment for getting the best result.

# The Work-In-Process Valuation under the Process-Costing with FIFO

<sup>1</sup>Hirohisa Hirai, <sup>2</sup>Hiroto Kataoka

<sup>1</sup>Kanagawa University

<sup>2</sup>Meiji University

Corresponding Email: hirai@kanagawa-u.ac.jp

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**Keywords:** Management Accounting, Process Costing, Work-in-Process, FIFO

Companies adopting a process costing system expect effective cost management and useful cost information in order to facilitate decision-making. As per FIFO method of process costing, however, even if the system assumes that the beginning WIP is completed first, the beginning WIP cost in the previous-process affects the ending WIP cost in the post-process. Kataoka and Hirai (2015) built a model that assumes that the cost amounts of beginning WIP in the previous-process is defined as explanatory variables, although the costs (cost amounts) is equal to the unit costs (price factor) multiplied by the physical units (quantity factor). Therefore, we expand upon the concept of the degree of influence that the beginning WIP cost in the previous-process has on the calculation of the ending WIP cost in the post-process by incorporating both the price factor and the quantity factor into our analysis. In this paper, we have confirmed how both the price factor and the quantity factor of the beginning WIP cost in the previous-process affects the ending WIP cost in the post-process. Results revealed that as the ending WIP quantity in the post-process increases, the greater the influence becomes. In addition, we have clarified the degree of influence to the ending WIP cost in the post-process regarding to both the beginning WIP quantity in the previous-process and the percentage of completion of the beginning WIP in the previous-process.

***TRACK B***

***Business, Economics, Social sciences & Humanities***



# The Impact of Emotions Containing in Social Media Posts on User Responses - A Case Study of Taiwan Fan Page on Facebook

\*Pin-Hui Su

Department of Business Management-National Taipei University of Technology,  
Taiwan

Corresponding Email: newair2410@gmail.com

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**Keywords:** Bayesian Statistics, Poisson Regression, Social Media, Emotional Categories

With the rise of "social media", in addition to the diversification of transmission media, the flow of information is also faster. The purpose of this study is to explore the relationship between the implied information marketing activities and emotional categories posted on the fan page of social media Facebook and user reactions e.g. like, share, or comment. To understand better the implied information of the posts, in addition to Plutchik's wheel of emotions Plutchik, 1980, this study adds touching, assertiveness and marketing activities as implied information, 11 variables being used as the classification of the stickers in total. The result shows that surprise, sadness, and hate these three emotions were more likely to arouse the user's response. Besides, the data indicated that happy and trust, happy and surprise, happy and sadness, trust and sadness, fear and surprise, fear and expectation, surprise and sadness, and surprise and expectation these emotions presented more obvious correlation. As mentioned above, the study suggests that social media operators can take advantage of emotional inspiration to strike a chord from users by adding some descriptions of emotion in the simple context. On the other hand, if the post contents could impressive the users, it is more likely to arouse the user's response and feedback.

## ***UP COMING EVENTS***

You can find the details regarding our upcoming events by following below:

<https://esrdb.com/conferences/>



## Vision

Invests in creation of 21st century engineers and discovery of technologies through transformational center-based research, research in education and inclusion, and research opportunities for students and teachers.

## Mission

To increase the diversity of the scientific and engineering workforce by including all members of society, regardless of race, ethnicity, or gender, in all aspects of the centers' activities. Because ESRDBs play critical roles in academe by integrating research, education, diversity, outreach, and industrial collaboration.



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