

2014 年度 試験研究助成 一覧

No	大学名	研究テーマ	研究者
1	インドネシア 大学 (UNIVERSTIAS INDONESIA)	Scroll Compressor Re-Engineering for ORC (Organic Rankine Cycle) Expander using Environmentally Friendly Low Temperature Boiling Gas 環境にやさしい低沸点ガスを使っている ORC (有機ランキンサイクル、バイナリーサイクルともいう) 膨張器のためのスクロール圧縮器の再設計	Ir. Budihardjo, Dipl Ing
2		Policy Analysis for Utilization of East Kalimantan Natural Gas to Match Demand of Cheap, Efficient and Clean Natural Gas for Java House Hold and Industries ジャワ島の家庭や産業用に、安く、効率的、クリーンな天然ガスの需要に対応する東カリマンタン天然ガス利用の政策分析	Parulian Paidi Aritonang SH, LL.M., M.PP
3		Utilization of Golden Snail (Pomacea Canaliculata Lamarck) as a Source of Local Microorganism for Compost Production 堆肥生産のための現地の微生物の原料としての金色のカタツムリ (Pomacea Canaliculata ラマルク) の利用	Prof. Sutrasno Kartohardjono, Ph.D
1	バンドン 工科大学 (INSTITUT TEKNOLOGI BANDUNG)	Dynamic Reactor Design at Pilot Scale for Catalytic Oxidation of Gasoline Vapor Waste at SPBU 燃料充填所 (インドネシア語略称: SPBU) で排出されるガソリンの気化蒸気を酸化触媒処理 (= 無害化) するための試験規模 (パイロットスケール) の動的反応器設計	Dr. Yogi Wibisono Budhi ST., MT.
2		Synthesis and photoluminescence of carbon nanoparticle phosphor material カーボンナノ蛍光体材料の合成と光ルミネセンス (フォトルミネセンス)	Dr. Ferry Iskandar M.Eng.
3		Enhancement of vetiver oil production through polyploidization of Vetiveria zizanioides Nahl ベチバー (インド原産のイネ科) の倍数体形成処理による、ベチバー油生産の拡大	Dr. Iriawati MSc.
1	ボゴール 農業大学 (INSTITUT PERTANIAN BOGOR)	A creative idea on application of the nanomaterials for biogas and organic fertilizer production based on eco-friendly and eco-business with community partnership surrounding. 周囲の地域社会の協力を得た環境にやさしく、かつエコ・ビジネスに基づいたバイオガスと有機肥料生産のためのナノ材料の応用に関する独創的な考え	Zainal Abidin Sri Malahayati Yusuf Endah Rahayu
2		Solid Waste Disposal and Management in Bogor Agricultural University, Indonesia Bogor 農業大学の固形廃棄物処分と管理	Dr. Yudi Setiawan, Sp., M.Sc Dr. Liyantono, STP., M.Agr Mufubi Agaton, B.Sc

No	大学名	研究テーマ	研究者
3		<p>Perception, Attitude, and Behavior of Students and Teachers toward Waste Management In Bogor Agricultural University, Bogor District, Indonesia</p> <p>インドネシア Bogor 地区、Bogor 農業大学での廃棄物管理に対する学生と教員の認識、態度と行動</p>	<p>Rais Sonaji. SP, MSI Tovan Yulianto, MM Prita Ayu Permatasari, SP</p>

2014 年度 試験研究助成 一覧

No	大学名	研究テーマ	研究者
1	サラワク大学 (UNIVERSITI MALAYSIA SARAWAK)	Design Of Integrated Filter Antenna For Microwave Imaging System マイクロ波結像システム用の統合型アンテナフィルターの設計	Dr Dyg Azra bt Awg Mat Dr Kismet Hong Ping Dr Shafrida bt Sahrani Dr Thelaha Hj Masri
2		Digital Index Quantitator : From Manual to Digital デジタル・インデックス計測器: マニュアルからデジタルへ	Sharifah Masniah Wan Masra Prof Madya Dr Mohd. Saufee b. Muhammad Prof Madya Dr Rahardjo Darmanto Djojodibroto
3		Soft Error Mitigation in Asynchronous Communication System 非同期通信システムにおけるソフトエラーの軽減	Norhuzaimin Julai Dr Lakshmanan al Gurusamy
4		Synthesis of Low Power Fast Adders Using Reversible Logic リバーシブル・ロジックを使用した低消費電力の高速加算器の合成	Dr Lakshmanan al Gurusamy Norhuzaimin Julai
5		The Use Of Electromagnetic Energy In The Detection And Identification Of Objects Buried In Various Soil Conditions さまざまな土壌条件に埋められた対象物の検出と識別における電磁気エネルギーの利用	Dr Kismet Hong Ping Prof Madya Dr Azhaili b Baharun Dr Hushairi Zen Dr Shafrida bt Sahrani Dr Dyg Azra bt Awg Mat
6		Performance And Service Life Prediction Of Low-Co Alkali-Activated Materials Using Local Waste Products 地元の廃棄物を使用した低アルカリ活性化材料の成績と寿命予測	Dr Idawati bt Ismail Dr Raudhah bt Ahmadi
7		Electrical Power Quality Events Analysis Using Wavelet Transform “ウェーブレット変換”を用いた電力品質イベント分析 ※ ウェーブレット変換…信号符号化や画像圧縮などに用いられる変換方式	Shirley ak Rufus Prof Madya Dr Azhaili b Baharun Dr Hushairi Zen Dr Kismet Hong Ping Dr Martin Anyi Nurul Izzati bt Hashim Mohd Hafiez Izzwan b Saad Nazreen bt Junaidi
8		Production of Ultrafine Palm-Oil-Fuel-Ash (POFA) Pozzolan using a Simple Wind Tunnel System 簡易風洞システムを用いた超微細パームオイル・燃料・灰 (POFA) からポゾランの生産 ※ポゾラン…セメントの混和剤	Dr Raudhah bt Ahmadi Dr Delsye Teo Ching Lee Dr Idawati bt Ismail Prof Dr MD Abdul Mannan

No	大学名	研究テーマ	研究者
9	サラワク大学	The Design of Insulated Gate Bipolar Transistor (IGBT) for Solar PV Application 太陽光発電応用品としての絶縁ゲート型バイポーラトランジスタ (IGBT) の設計	Asrani b Lit Dr Siti Kudnie Sahari Dr Rohana bt Sapawi Dr Dyg Azra bt Awg Mat Elizabeth Kho Ching Tee
10		Modeling Power Quality Performances on Generated Power from Pump as Turbine (PAT) タービン水車から発電された電力の電源品質のパフォーマンスをモデル化 (PAT)	Assoc. Prof Dr Al-Khalid Othman Dr Hushairi Zen Mohd Azlan Ismail

**OSAKA GAS FOUNDATION
OF INTERNATIONAL CULTURAL EXCHANGE
YEAR 2014/2015**

FINAL REPORT

**Scroll Compressor Re-Engineering
for ORC (Organic Rankine Cycle) Expander
using Environmentally Friendly Low Temperature
Boiling Gas**



Principal Investigator :

Dr.Ir. Budihardjo, Dipl Ing

DEPARTMENT : MECHANICAL ENGINEERING

FACULTY : ENGINEERING

**SCIENCE AND TECHNOLOGY RESEARCH CENTER
UNIVERSITAS INDONESIA
DEPOK, October 2015**

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ABSTRACT

Compressor is one of mechanical equipment which is used to increase pressure in compressible fluids like air or gas. In its development, Compressor as one of mechanical equipment has experienced evolution and change in term of work process and system as a result of fast technology advance. One of the development of scroll compressor is expander. Scroll expander has high efficiency and can be used in Organic Rankine Cycle. The purposes of this research are to re-engineered scroll compressor become an expander, and to analyses the performance using an environmentally refrigerant gas R-134a.

I. BACKGROUND

Indonesia has a rapid increase in the national daily consumption especially in the field of electrical energy and has been developing sources of renewable energy, including solar energy. Energy scarcity is a classic problem faced by each country in the world especially Indonesia. Indonesia government always try to organize energy policy each year. One of the examples is national energy policy which is appointed as the foundation to develop and increase the capability of energy in the future and also called energy mix. Energy mix policy consist of this following quota : coal 32.7 %, natural gas 30,6%, petroleum 26,2%, water 2,4%, geothermal 3,8%, and others 4,4%. [8] Even, with that policy in order to keep the availability of energy source in the future, energy crisis still hamper Indonesian people. Indonesian people have high dependence to fossil fuel nowadays. The production of fossil fuel in Indonesia is declining each year due to run out sources. Because of that, Indonesia needs to import fossil fuel to fullfil the demand of fossil fuel.

Due to the consumption of fossil fuels and environment problems, the low-grade energy recovery technique has brought many interest. Scroll machine with the high efficiency, simple structure and small scale, is used as compressor in the refrigeration system and heat pump system. Scroll expander could be used as the energy recovery machine in the small energy recovery system and normally applied in the low-temperature waste heat recovery system. Most of the research on scroll expander is concentrated on the steady performances either simulation or experiments.

Seeing this problem, research in new energy technology is needed to minimize the dependence of fossil fuel in the future. Organic Rankine Cycle (ORC) is the right invention to face this problem. The application of ORC is wide including power generation. The aim of this research is to re-engineered a scroll compressor to be used as expander for Organic Rankine Cycle (ORC).



FINAL RESEARCH REPORT

Principal Investigator

Parulian Paidi Aritonang SH., LL.M., M.PP

**POLICY ANALYSIS : UTILIZATION OF EAST KALIMANTAN
NATURAL GAS TO MEET DEMAND OF CHEAP, EFFICIENT,
AND CLEAN NATURAL GAS FOR JAVA PEOPLE**

**OSAKA GAS FOUNDATION
OF
INTERNATIONAL CULTURAL EXCHANGE**

**SCIENCE AND TECHNOLOGY REARCH CENTER
UNIVERSITAS INDONESIA
DEPOK 2015**

FINAL REPORT

1. Research Project Title	:	Policy Analysis For Utilization Of East Kalimantan Natural Gas To Match Demand Of Cheap, Efficient, And Clean Natural Gas For Java Household And Industries
2. Principal Investigator		
a. Name	:	Parulian Paidi Aritonang SH., LL.M., M.PP
b. Status	:	Permanent Lecturer
c. Main Field Of Spesification	:	Economic and Public Policy
	:	Economic Law and Public Policy
d. Department	:	Law
e. Faculty	:	
3. Summary Of Research Project	:	Energy is one basic human need that currently fulfillment mostly dependent on the natural resources in the form of petroleum. So for gain energy security, Indonesia is now developing utilization of Natural gas for Domestic market. But between Gas reserve and infrastructure in Indonesia is not balance which Indonesia has abundant gas reserve when infrastructure is still in developing. Use of natural gas is increase due to policy to use natural. But in West Java demand of natural gas is not comparable with the gas source, so government give solution with Kalija project but it's still have problem about economic sector and local government policy. KALIJA Project pipeline is unproper way, because it would create more expensive gas price to java consumer. It would be against the competition law as uneficiency, dissipation and uncompetitive pricing
4. Field Discipline	:	Energy Law and Policy
5. Research Location	:	Jakarta, (Java , East Kalimantan, South Sumatera)
6. Research Project	:	October 2014/2015
7. Progress Activity	:	Final Report

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FINAL REPORT
OSAKA GAS FOUNDATION

TITTLE
**UTILIZATION OF GOLDEN SNAIL (*POMACEA CANALICULATA*
LAMARCK) AS A SOURCE OF ACTIVE MICROORGANISM FOR
COMPOST PRODUCTION**



Prof. Sutrasno Kartohardjono, PhD (NIDN 0006016308)

UNIVERISTAS INDONESIA
2015

EXECUTIVE SUMMARY

Golden snail or *Pomacea canaliculata* Lamarck is a dangerous pest for the rice crops. This species is one enemy to the farmers that can reduce their rice crops. An issue to be raised in this research is how the golden snails can be utilized by farmers for their rice crops. One of the utilization is to use the golden snail as a source for active microorganisms for composting. Therefore, how to prepare the active microorganisms from golden snail and how to prepare compost are also issues to be raised in this research. Golden snail can be utilized as a source of active microorganism for compost production to support sustainable development in village area. Sustainable waste strategy in the area of agriculture is becoming increasingly important because of the need to conserve and recycle organic material in the soil. The use of biological fertilizer (biofertilizer) and biopesticides, which contains microorganisms that are efficient, will improve plant growth in many ways compared to fertilizers, pesticides and synthetic chemical insecticides and thus assist in environmental sustainability and productivity of plants. The aims of this study is to utilize golden snails from rice fields as a source of active microorganism for compost production. The compost then will be sent back to the rice fields as a natural fertilizer to substitute chemical fertilizer, which is produced using natural gas as a main feedstock.

Materials needed for active microorganisms' production are: golden snails, red sugar, coconut water, plastic container, plastic sheets and plastic hose. The preparation of active microorganisms was prepared by mixing of 5 kg of crushed golden snails, 1 kg of crushed sugar and 10 liter of coconut water into the plastic container. We allow 15 days for fermentation of the mixture to produce microorganism before it can be used as active microorganisms for compost production. Meanwhile, the the compost was prepared by mixing household wastes such as leaves and tree trunks, animal waste, active microorganism, water in plastic container. There are three types of active microorganisms produced in this research. These active microorgansms were then characterized using fluorescence microscope in Olympus Bio-Imaging Center Integrated Laboratory Research Center University of Indonesia. Meanwhile, composts produced were then characterized in Environmental Engineering Study Program University of Indonesia.

Based on observation with the microscope, these coloring samples showed bacteria in the form of bacilli single gram positive (+) with size range of 2.4 - 4.7 μm , 2.1 - 4.1 μm and 3.1 - 4.4 μm for microorganisms Type 1, Type 2 and Type 3, respectively. This bacterium is the genus *Lactobacillus* sp. In the fermentation process this bacterium act to produce lactic acid from sugar and other carbohydrates produced by photosynthetic bacteria and yeast. It can also be seen the bacteria in the form of rods chain (bacilli) gram-positive, sized up to 8.4 μm for microorganisms Type 1 and Type 3 in Fig. 1a and 1c, respectively. This is a characteristic of the genus *Bacillus* sp. Based on literature, bacteria that can dissolve phosphate is *Bacillus megaterium*, *Bacillus subtilis*, *Pseudomonas striata* and *P. liquifaciens*. *Bacillus subtilis* is an example of the type of *Streptobacillus* which is a common inhabitant of the land and this species can produce antibiotics. Meanwhile, active microorganisms without coloring showed the oval yeasts with varying in size but larger than bacteria are shown in microorganisms Type 1 and Type 3, respectively. It was hardly noticeable found yeast in without coloring sample for microorganisms Type 2. In fermentation process, yeasts act as fermentative fungi. Yeasts cells have a variety of sizes from 1 to 50 μm , where in the without coloring samples the size is around 5 μm and 6 μm for microorganisms Type 1 and Type 3, respectively. Yeast Cells (yeast) is a microscopic one-celled yeasts with varying sizes, from 1-5 μm to 20-50 μm , and the width of 1-10 μm .

Composts characterization include water contents, water binding abilities, pH, organics materials, organics carbon, total nitrogen contents, C:N ratio, phosphor contents, potassium contents and fecal coliform contents. Composts characterization showed that apart of water binding ability compost Type 1 meets requirement stated in the SNI. Compost Type 2 has the ability to bind water and C:N ratio under SNI. Meanwhile, compost Type 3 has the ability to bind water, water and organic material contents, and C:N ratio under SNI.

Research Report
Osaka Gas Foundation of International Cultural Exchange
(OGFICE)



Research Title
**Dynamic Reactor Design at Pilot Scale for
Catalytic Oxidation of Gasoline Vapor Waste at
SPBU**

Principal Investigator:
Dr. Yogi Wibisono Budhi

Academic Unit

Research Division : Chemical Engineering Process Design and
Development
Faculty/School : Industrial Technology

INSTITUT TEKNOLOGI BANDUNG

November 2015

I. IDENTITY PAGE

1. Title : Dynamic Reactor Design at Pilot Scale for Catalytic Oxidation of Gasoline Vapor Waste at SPBU
2. Topic : Environment
3. Research Period : November 2014/2015
- 4.1. Principal Investigator :
- a. Full Name : Dr. Yogi Wibisono Budhi
- b. Academic Rank : Associate Professor
- c. NIP : 197102101999031001
- d. Current Position : Faculty Member
- e. Academic Unit : FTI ITB
- f. Office Address/Phone/Fax/E-mail : Jl. Ganesha 10 Bandung, Indonesia/+62-22-2500989/+62-22-2501438/e-mail: Y.Wibisono@che.itb.ac.id
- g. Home Address/Phone/Fax/E-mail : Komplek Cigadung Makmur 3 Bandung, Indonesia/+6285659230707/e-mail: yogiwbudhi@yahoo.com

4.2 Members of the Team:

No	Name and Academic Rank	Field of Expertise	Institution	Allocation of Time	
				Hrs/week	Months
1	Dr. Subagjo	Catalyst	FTI ITB	10	10

4.3 Research Assistants/Students (mention names when available):

No	Name	Departement and NIM	Alocation of Time	
			Hrs/week	Months
1.	Aang Nuryaman	Mathematic (30110008)	15	10
2.	Fuji Permata Sari	Chemical Engineering (23013016)	15	10
3.	Yahdi Akbar	Chemical Engineering (23012306)	15	10

5. Approved budget : Rp 50.000.000,-



Bandung, 1 December 2015
Principal Investigator

Dr. Yogi Wibisono Budhi
NIP 197102101999031001

I. EXECUTIVE SUMMARY

- 1. TITLE OF RESEARCH :**
Dynamic Reactor Design at Pilot Scale for Catalytic Oxidation of Gasoline Vapor Waste at SPBU
- 2. HEAD OF RESEARCH TEAM :**
Dr. Yogi Wibisono Budhi
- 3. TEAM MEMBERS :**
Dr. Subagjo, Dr. Aang Nuryaman, Yahdi Akbar, ST.MT., Fuji Permata Sari, ST.MT.
- 4. OFFICIAL ADDRESS :**
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- 5. EXTENDED ABSTRACT :**
One type of air pollution that occurs around us is the pollution caused by gasoline vapors, which are emitted into the air. The emission of the gasoline vapors can occur at the time of petrol injection into the reservoir of the gasoline station and petrol injection from the reservoir container into a car tank while loading. The gasoline vapor emissions have adverse effects on human health and the environment, and play a role in the formation of photochemical smog, the greenhouse effect, and neurological problems in urban children. For example, one of the compounds in gasoline, namely benzene, if inhaled, can result in acute risk of cancer. Therefore, the waste treatment of the gasoline vapor is necessary.

An efficient and proper way in processing the gasoline vapor emissions is the catalytic combustion in a fixed bed reactor. The conventional combustion technologies either thermal or catalytic oxidation requires external heat intake due to gasoline vapors are at ambient temperature. In this study, a Reverse Flow Reactor (RFR) will be proposed for treating of the gasoline vapor emission. By alternating the flow direction, the heat released by exothermic reaction will be trapped inside the fixed bed. The trapped energy can be used to heat up the cold feed gas before entering the catalytic section. In order to achieve the autothermal operation, the study of dynamic behavior, reactor design, and RFR operation will be done at a pilot scale. In this study, the focus of the research is directed at the design of the pilot-scale reactor capable of processing gasoline vapor emissions at a rate of 25 L/min with a concentration of about 1% gasoline vapor-v. The expected performance targets are achieved conversion of at least 99% of gasoline vapor and thermal heat produced from the combustion reaction.

The purpose of this study was to examine the aspects of the design of catalytic reactors which includes the study of heat and mass transfer events, chemical reaction engineering, process equipment, operating a pilot-scale dynamics, and techniques taking heat from the reactor. The Pt/ γ -Al₂O₃ catalyst will be used to oxidize the gasoline vapor. In particular, the procedure of the reactor operation at start-up and normal operation is also important to be determined.

The research method includes the reactor design consisting of the determination of the reaction kinetics, design criteria, and the dimensions of the tool; conduct experiments on a pilot scale by varying the switching time at start-up and normal operation. Analysis of the composition of the reaction products in the reactor output stream using the GC for the components CO₂ and CO, whereas the conversion of gasoline vapor is calculated based on mass balance. The steady state will be used as an initial condition for RFR as well as performance comparison base of the reactor.

The main benefit of this study is the reduction of the impact of gasoline vapor emissions that are beneficial to climate change mitigation. The success of this project is very useful to make a clean gas stations operating in Indonesia. In this study, the residence time applied for reactor operation was determined due to Mears criterion in order to avoid the external mass transfer limitation. The residence time used in this study was in the range of 0.2 – 2 s.

Keywords: Reactor; Gasoline vapor emission; Design; Pilot scale; Dynamic system;

6. LIST OF RESEARCH OUTPUT

Manuscript to be submitted to International Journal (see in the attachment).

II. TECHNICAL REPORT

Modeling and Simulation of Pilot-Scale Reverse Flow Reactor for Oxidation of Gasoline Vapor

Fuji Permata Sari, Yahdi Akbar, Yogi Wibisono Budhi

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Abstract. During last decade, the treatment of gasoline vapor has been developed regarding the significant negative effects such as health, environment, and economic loss. Gasoline vapor oxidation in reverse flow reactor (RFR) has been considered to be the most effective method to treat the gasoline vapor. The application of RFR corresponds to the gasoline vapor concentration at fuel station, which is remarkably low concentration and always fluctuates. The RFR is a fixed bed reactor in which the direction of the feed gas is periodically reversed. The gasoline vapor oxidation is an exothermic reaction, thus conducting the reaction in RFR would lead to heat trap effect. This effect can be used to achieve and maintain a higher temperature in the reactor and also enable to achieve the autothermal condition, hence reducing the heat supplied from preheater. Adiabatic condition is crucial for achieving the autothermal condition. RFR, operated on a large scale, will behave close to adiabatic. This research aims to study the effect of reactor capacity on autothermal behavior of RFR and influence of feed gas

Research Report
Osaka Gas Foundation of International Cultural Exchange
(OGFICE)



Research Title
**SYNTHESIS AND
PHOTOLUMINESCENCE OF CARBON
NANOPARTICLE PHOSPHOR MATERIAL**

Principal Investigator:
Dr. Eng. Ferry Iskandar

Academic Unit

Research Division : Electronic Materials Physics
Faculty/School : Faculty of Mathematics and
Natural Sciences (FMIPA-ITB)

INSTITUT TEKNOLOGI BANDUNG
November 2015

I. EXECUTIVE SUMMARY

1. **TITLE OF RESEARCH** : SYNTHESIS AND PHOTOLUMINESCENCE OF CARBON NANOPARTICLE PHOSPHOR MATERIAL
2. **HEAD OF RESEARCH TEAM** : Dr. Eng. Ferry Iskandar
3. **TEAM MEMBERS** : Prof. Dr. Khairurrijal
Prof. Dr. Mikrajuddin Abdullah
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5. **EXTENDED ABSTRACT** :

The emergence of carbon nanoparticles (CNDs) has become an interesting research in recent years. This is because carbon materials are relatively inexpensive, abundant, chemically inert and biocompatible. Carbon nanoparticles is a quasi-spherical particles with finite size, generally less than 10 nm, and consist of either amorphous or graphitic carbon. Various studies related to the CNDs have been successfully demonstrated promising potential applications in bioimaging, phosphor-based white LEDs, sensors, photocatalysts and even in the treatment of cancer therapy applications. The problem encountered today is the need for a deeper study of CNDs, especially concerned with the synthesis. The current interesting processes of the synthesis of CNDs process is using an microwave method as (a new method). This study is expected to provide a general overview with regard to the process of synthesis, physical and optical properties, and possible applications of carbon nanoparticles phosphor.

CNDs were synthesized by carbonization of Citric Acid (CA) (Merck) with commercial urea through microwave assisted method. In brief, several mass variation of CA (0.015 - 0.250 g) and 3 g urea were dissolved in a mixture of 5 ml distilled water in a beaker. Then the solution was stirring for 5 mins and it was transferred to an oven at 100 °C for an hour. Microwave oven with temperature limit of 200 °C and power of 800 W was performed for 2 min until the colorless powder was changed into color of visible light, and a light yellow solid phase of CNDs was obtained. Further, photoluminescence (PL) intensity of CNDs sample was determined by photoluminescence spectrofluorometer (PL Spectra; RF-5300PC, Shimadzu Corp., Kyoto). The device consists of xenon laser which emits a continuous spectrum with a wavelength of 200 nm - 800 nm.

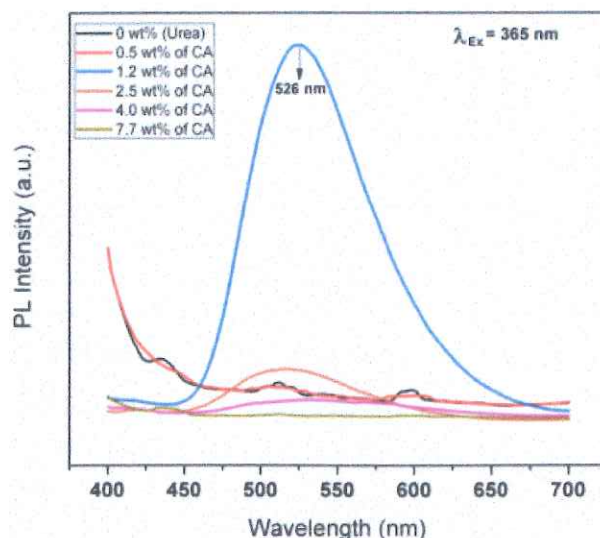


Figure I.1. PL spectra CNDs with variation CA mass 0.5 wt% to 7.7 wt% with heating for 120 s.

Figure I.1. shows the photoluminescence (PL) spectra of CNDs powder with difference CA mass. The powder was excited by a Xe lamp from the fluorescence spectrometer. The addition of carbon source mass affect to intensity of luminescence. The maximum intensity of the bright yellow obtained in samples with a mass 1.2wt% of CA with peak wavelength of the emission spectra are found to be around 526 nm. It is verified that addition of 1.2wt% CA mass enhances the emission efficiency of CNDs. On the other hand, sample with CA mass 0wt% and 0.5wt%, didn't give emission spectrum due to not enough power to reaction between C and N. Thus, the sample didn't produce carbon nanodots and no emissions. Then, sample with 7.7 wt% CA produced CNDs, but an excess amount of carbon causes the sample to resemble charcoal. The intensity of luminescence is reduced due to the emission color of CNDs have absorbed by carbon.

6. LIST OF RESEARCH OUTPUT

A. Publication on International Journal

Nakul, F., B. W. Nuryadin, A. H. Aimon, F. Iskandar: Analysis of Energy Heat Transfer Mechanism via Microwave-Assisted Method of Synthesis Carbon Nanodots Material (in preparation)

B. Publication on Intenational Conference Proceeding

- a. Nakul, F., A. H. Aimon, B. W. Nuryadin, F. Iskandar: Preliminary Study of Heat Supply during Syhntesized Carbon Nanodots Material, AIP Proceeding, 2015 (submitted)

Research Report
Osaka Gas Foundation of International Cultural Exchange
(OGFICE)



Research Title
**Enhancement of vetiver oil production
through polyploidization of *Vetiveria
zizanioides* Nahl.**

Principal Investigator:
Dr. Iriawati

Academic Unit

Research Division : Plant Science and Biotechnology
Faculty/School : School of Life Sciences and Technology

INSTITUT TEKNOLOGI BANDUNG

November 2015

I. IDENTITY PAGE

1. Title : Enhancement of vetiver oil production through polyploidization of *Vetiveria zizanioides* Nahl.
2. Topic : Environment
3. Research Period : February – November 2015
- 4.1. Principal Investigator :
- a. Full Name : Dr. Iriawati
- b. Academic Rank : Assistant Professor (Lektor)
- c. NIP : 196205071988032001
- d. Current Position : Lecturer
- e. Academic Unit : School of Life Sciences and Technology
- f. Office Address/Phone/Fax/E-mail: Jl. Ganesa 10, Bandung 40132/022-2500258/022-2500258/
iriawati@sith.itb.ac.id
- g. Home Address/Phone/Fax/E-mail: Komp. PPR ITB B-17, Mekarwangi, Lembang, Kabupaten Bandung

4.2 Members of the Team:

No	Name and Academic Rank	Field of Expertise	Institution	Allocation of Time	
				Hrs/week	Months
1.	Dr. Rizkita R. Esyanti	Plant Physiology	SITH - ITB	4	10
2.	Dr. Ahmad Faizal	Plant Physiology	SITH - ITB	4	10

4.3 Research Assistants/Students (mention names when available):

No	Name	Departement and NIM	Alocation of Time	
			Hrs/week	Months
1.	Nurul Hermawan Aini	Biology, 10411004	10	10
2.	Siti Maryam	Biotechnology, (21113050)	12	10

5. Approved budget : Rp. 52.650.000,00

Head of Academic Unit,
School of Life Sciences and Technology,
Dean



Dr. Nyoman P. Aryantha
196505221990011002

Bandung, 13th November 2015
Principal Investigator



Dr. Iriawati
196205071988032001

I. EXECUTIVE SUMMARY

1. **TITLE OF RESEARCH** : Enhancement of vetiver oil production through polyploidization of *Vetiveria zizanioides* Nahl.
2. **HEAD OF RESEARCH TEAM** : Dr. Iriawati
3. **TEAM MEMBERS** : Dr. Rizkita R. Esyanti; Dr. Ahmad Faizal
4. **OFFICIAL ADDRESS** : SITH – ITB, Jl. Ganesa 10, Bandung 40132, INDONESIA
5. **EXTENDED ABSTRACT** :

Vetiver (*Vetiveria zizanioides*) is a plant belongs to Poaceae. Its fine roots contain fragrant oil, which is a perfume by itself, known as vetiver oil. Vetiver oil produced in Indonesia has a worldwide reputation as one of the finest aromatic oils. Vetiver oil is a complex mixture of sesquiterpene alcohols and hydrocarbon mostly used as a basic material for perfumery and cosmetics. Furthermore, the biological activity of vetiver oil is also important. Termicidal, insecticidal, anti microbial and antioxidant activities of Vetiver oil have been described. Because of its complexity, the oil is difficult to reproduce with synthetic aromatic chemical formulations. Recently, however, the production and quality of the oil was declined due to inability to provide good quality of plant roots as its source. Moreover, differences in the quality of the oil may depend on genetic, environmental and extraction technology factors. In order to meet the demand for such important oil, such as vetiver oil, alternative methods are needed. Tissue culture is widely known as technology required to produce numerous plantlets in a short time. Therefore, research on the *in vitro* production of plants produced vetiver oil need to be carried out as a basic requirement for scale up production in industry. Aim of this research are to induce polyploidization in the *in vitro* culture of *Vetiveria zizanioides* and to evaluate its vetiver oil production. In this research, we used several explant, namely leaf and shoot basal to induce callus and plant regeneration, which will be used for polyploidy induction. Those explants were culture in MS (Murashige & Skoog) media supplemented with naphthalene acetic acid (NAA) and benzyl aminopurine (BAP), for plant regeneration, or 2,4-dichlorophenoxyacetic acid (2,4-D), Indole acetic acid (IAA) and kinetin for callus induction. Some explants were treated in several concentration of colchicine (0/K, 200, 400 or 800 ppm) for 1, 24 or 48 h. The treated explants were also cultured in the same media as untreated one. Sub-culturing was conducted in the same media in every 3 weeks. The results showed that higher regeneration ability was obtained from shoot basal explants. The explants developed shoot indirectly through callus stage. Explant treated with 200 ppm colchicine for 48 h showed growth inhibition and its survival rate was also declined. Cytological analysis showed that there was no somaclonal variation occurred, the regenerant did not increase chromosom number. Analysis of secondary metabolites in root of some untreated plantlets showed that terpenoid derived metabolites has been found in its root. Analysis of polyploidy plants are still in progress. At this point, it can be concluded that shoot regenerated shoot performed similar character as mother plants. Colchicine treatment can reduce regeneration ability as well as its survival rate.

6. LIST OF RESEARCH OUTPUT

- article published in International Journal
- presentation in International Conference

**The Osaka Gas Foundation of International Cultural Exchange (OGFICE)
Research Grant FY 2014/2015**

Final Report

**A creative idea on application of the nanomaterials for biogas and
organic fertilizer production based on eco-friendly and eco-
business with community partnership surrounding Bogor
Agricultural University (IPB).**

1. Zaenal Abidin

**Faculty of Mathematic and Natural Science IPB; and
Center for Environmental Research IPB**

2. Sri Malahayati Yusuf

Center for Environmental Research IPB

3. Endah Rahayu

Center for Environmental Research IPB



Submitted to:

**Center for Environmental Research
Bogor Agricultural University**

for

The Osaka Gas Foundation of International Cultural Exchange (OGFICE)

June 2016

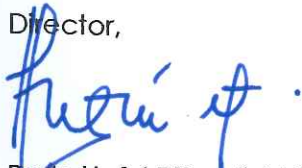
General Information

Title : A creative idea on application of the nanomaterials for biogas and organic fertilizer production based on eco-friendly and eco-business with community partnership surrounding Bogor Agricultural University (IPB).

Researchers:

- 1 Name : Dr. Zaenal Abidin, M.Sc
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- 2 Name : Sri Malahayati Yusuf, SP., M.Si
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Dramaga, Bogor.

Center for Environmental Research,
Bogor Agricultural University,
Director,



Dr. Ir. Hefni Effendi, M.Phil

Bogor, June 05, 2016

Principal Investigator,



Dr. Zainal Abidin, M.Sc

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**The Osaka Gas Foundation of International Cultural Exchange (OGFICE)
Research Grant FY 2014/2015**

Final Report

**Solid Waste Management in Bogor Agricultural
University, Indonesia**

**1. Dr. Yudi Setiawan, SP, M.Sc
Center for Environmental Research**

**2. Dr. Liyantono, STP, M.Agr
Faculty of Agricultural Technology**

**3. Mufubi Agaton, B.Sc
Master Program of Natural Resources and Environmental Management**



Submitted to:

**Center for Environmental Research
Bogor Agricultural University**

for

**The Osaka Gas Foundation of International Cultural Exchange (OGFICE)
December 2015**

General Information

Title : Solid Waste Management in Bogor Agricultural University, Indonesia: The first step towards a green university campus

Researchers:

1. Name : Dr. Yudi Setiawan, SP, M.Sc
Institution : Center of Environmental Research, Bogor Agricultural University (IPB)
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2. Name : Dr. Liyanton, STP, M.Agr
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3. Name : Mufubi Agaton, B.Sc
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Center for Environmental Research,
Bogor Agricultural University,
Director,



Dr. Ir. Hefni Effendi, M.Phil

Bogor, 24 December 2015
Principal Investigator,



Dr. Yudi Setiawan, SP, M.Sc

EXECUTIVE SUMMARY

The research was aimed at establishing how solid waste is being disposed and managed in Bogor Agricultural University (IPB), at Kampus Darmaga. The essence was to address the disposal and management of the different kinds of solid waste generated by the student, lecturer, staffs, offices and canteen in IPB. This research specifically characterized the kinds of solid waste generated, documented the amount of solid waste generated as well as problems associated with solid waste disposal and management in IPB.

Bogor Agricultural University (IPB) is an Indonesian State Agricultural University founded in 1963. The University is located in Bogor district-West Java Province. As one of the biggest in the higher education institution in Indonesia, the University boasts of a large enrollment of over 24,000 students (2009). This has resulted into generation of a significant amount of solid waste (both organic and inorganic) in the University. An estimated 44 tons of solid waste was revealed to be generated by the University monthly. However, the University is still bogged with the challenge of scale drawing an effective management approach for the ever growing amount of solid waste. Inadequate labor and facilities especially shortage of dustbins have left leaves, papers, leftover foods, food packaging materials, plastic bags and other plastics scattered in the University compound. This hasn't only seen the University compound stinky and disgusting but has also attracted a large number of flies (disease vectors), threatening the health of the University and the surrounding community.

At Cikabayan (the University waste dumping site) out of 44 tons of solid waste dumped monthly, only 28% is transported to Galuga waste dumping site in Bogor city and the rest (72%) is abandoned there. Since the University composting project is still small and ineffective, a lot of waste has accumulated at this site resulting into production of strong odor, leachate into the nearby stream and attraction of flies – another health and environmental hazard. Our objectives are: (1) to investigate and quantify the amount of solid waste generated by the University daily, and (2) to characterize the types of wastes generated. In addition, the result of this study will be useful to develop a waste bank program in order to increase the efficiency in solid waste collection in the University and the surrounding area.

Moreover, this study will develop a recommendation for the most appropriate approach for waste disposal and management in IPB. It will not only improve the environmental quality within the University and the surrounding area, and enhance the health standards of both the University and the surrounding community but also will serve as an example to many other Universities in the country with the problem of waste management.

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Final Report

Perception, Attitude, and Behavior of Students and Teachers toward Waste Management in Bogor Agricultural University, Bogor District, Indonesia

1. Rais Sonaji, SP., MSi

Center for Environmental Research, Bogor Agricultural University

2. Tovan Yulianto, MM

Center for Environmental Research, Bogor Agricultural University

3. Prita Ayu Permatasari, SP.

Center for Environmental Research, Bogor Agricultural University



Submitted to:

Center for Environmental Research

Bogor Agricultural University

for

The Osaka Gas Foundation of International Cultural Exchange (OGFICE)

November 2015


General Information

Title : Perception, Attitude, and Behavior of Students and Teachers toward Waste Management in Bogor Agricultural University, Bogor District, Indonesia

Researchers:

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Tel (0251) 8621262, 8621085, Fax. (0251) 8622134
Email: pplh.ipb.ogfice@gmail.com, URL: <http://http.ipb.ac.id>

Center for Environmental Research,
Bogor Agricultural University,
Director,



Dr. Ir. Hefni Effendi, M.Phil.

Bogor, November 15, 2015
Principal Investigator,



Rais Sonaji, SP., MSi.

EXECUTIVE SUMMARY

Bogor Agricultural University is one of the best universities in Indonesia. Total population of IPB is nearly 30,000 people. So, it can be estimated that waste generation is about 1,500 kg/day. Waste composition in Indonesia, generally, 70% organic and 30% inorganic. That composition is almost same with campus. On the other hand, waste management system in campus is still conventional and inadequate. Although IPB as one of the best universities in Indonesia has a human resources (students and teacher) that generally have a good academic performance, the institution has not been able to build good and adequate waste management system in campus. IPB has a plan to build a good waste management system and facilities in campus. Good waste management system will be successful if it is supported by the students and teacher perceptions, attitudes and behaviors in managing waste.

In this study, we investigated student's and teacher's perception, behavior, and attitude by spreading questionnaires. The questionnaires consist of 35 questions about their personal identity such as name, age, gender, occupation, and grade in university. The questionnaires also asked about their knowledge in campus waste management, the waste management problem, and the ideas of solution in waste management. From their answer, the information about student's and teachers perception, behavior, and attitude have been obtained.

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RINGKASAN LAPORAN AKHIR
GERAN PENYELIDIKAN OSAKA GAS
END OF OSAKA GAS
GRANT REPORT SUMMARY

A. Tajuk Projek <i>Project Title</i>	: DESIGN OF INTEGRATED FILTER ANTENNA FOR MICROWAVE IMAGING SYSTEM
Ketua Penyelidik <i>Project Leader</i>	: DR DAYANG AZRA BINTI AWANG MAT
Fakulti/Institut <i>Faculty/Institute</i>	: FACULTY OF ENGINEERING
Ahli Kumpulan Penyelidik <i>Research Team Members</i>	: DR KISMET ANAK HONG PING DR SHAFRIDA BINTI SAHRANI DR THELAHA HJ MASRI
B. Tarikh Geran Diluluskan <i>Grant Approval Date</i>	: 1 JANUARY 2015
Tempoh Projek <i>Project Duration</i>	: 1 YEAR
Peruntukan Yg. Diluluskan <i>Budget Approved</i>	: RM 4000.00
Perbelanjaan Terkini <i>Expenditure To-Date</i>	: RM 4000.00
C. Pencapaian Keseluruhan <i>Overall Achievement</i>	<p>Huraikan pencapaian berbanding objektif, hipotesis serta permasalahan asal yang diselidiki.. <i>Describe the achievements in relation to the original objectives, hypothesis and research problems.</i></p> <p>Conventionally, filter and antenna are connected directly and this usually causes an impedance mismatch and deteriorates the filter's performance, especially near the band edges. Thus, in this</p>

research, integrated filter-antenna is proposed consist of rectangular patch antennas. Patch antenna is used because it can be mounted on flat surface, simple to fabricate and easy to modify and customize. This antenna structure will be designed on FR4 dielectric substrate. FR4 is a composite material composed of woven fiberglass cloth with an epoxy resin binder with relative permittivity of 4.8.

The proposed integrated filter antenna is designed at 2.4GHz for microwave imaging system. The antenna are designed cascaded with bandpass filter to reduce the losses and impedance mismatch. Simulation results show that the designed integrated filter antenna has good performance in terms of bandwidth and loss. This result is presented in Engineering Conference (EnCon2015) and awarded as Best Paper Award. This research has achived its objectives very well. More design and analysis should be conducted with more allocation of time. This design might be enhance by using different methods of design expecially at the antenna part. For this short term grant, the research has ended successfull and all the objectives has been achieved.

D. Pencapaian Utama

Key Findings

The proposed integrated filter antenna is designed at 2.4GHz for microwave imaging system. The antenna are designed cascaded with bandpass filter to reduce the losses and impedance mismatch. Simulation results show that the designed integrated filter antenna has good performance in terms of bandwidth and loss. This result is presented in Engineering Conference (EnCon2015) and awarded as Best Paper Award. This research has achived its objectives very well..

E, Hasil Penyelidikan

Deliverables

Sila tandakan item yang berkaitan pada senarai berikut:

Please tick the relevant items below:

	Item	Bilangan/Number
	Kertas teknikal/bersiri dalaman <i>Internal technical/serial papers</i>	
	Tesis/disertasi pelajar sarjana <i>Student's Masters thesis/dissertation</i>	
	Tesis pelajar PhD <i>Student's PhD thesis</i>	
	Kertas persidangan tempatan <i>Local conference papers</i>	1 → EnCon 2015 (7-9 October 2015) -awarded as Best Paper Award
	Kertas persidangan antarabangsa <i>International conference papers</i>	
	Makalah dalam jurnal tempatan <i>Local journal papers</i>	
	Makalah dalam jurnal antarabangsa	



RINGKASAN LAPORAN AKHIR
GERAN PENYELIDIKAN OSAKA GAS
END OF OSAKA GAS
GRANT REPORT SUMMARY

A. Tajuk Projek <i>Project Title</i>	: Digital Index Quantitator – From Manual to Digital
Ketua Penyelidik <i>Project Leader</i>	: Sharifah Masniah Wan Masra
Fakulti/Institut <i>Faculty/Institute</i>	: Kejuruteraan
Ahli Kumpulan Penyelidik <i>Research Team Members</i>	: Prof Madya Dr Mohd Saufee Muhammad (FENG) Prof Madya Dr Rahardjo Darmanto Djojodibroto (FMHS) Dr Rohana Sapawi (FENG) Goh Kian Lian (FENG) Joys Sheena Henry (FENG)
B. Tarikh Geran Diluluskan <i>Grant Approval Date</i>	: 30 Oktober 2014
Tempoh Projek <i>Project Duration</i>	: 12 bulan (1 Jan – 31 Dec 2015)
Peruntukan Yg. Diluluskan <i>Budget Approved</i>	: RM 4, 500.00
Perbelanjaan Terkini <i>Expenditure To-Date</i>	: RM 4, 500.00
C. Pencapaian Keseluruhan <i>Overall Achievement</i> Huraikan pencapaian berbanding objektif, hipotesis serta permasalahan asal yang diselidiki. <i>Describe the achievements in relation to the original objectives, hypothesis and research problems.</i> <p>The project set out to design and develop a circumferential finger measurement device for facilitating measurements at various points along fingers, particularly at the nail-fold (NF) and distal interphalangeal joint (DIP). This digital readout device would take an accurate measurement of a finger circumference to obtain data for the studies of finger clubbing evaluation. The quantification of finger clubbing using physical examination is assessed through Digital Index (DI) measure. It measures these two separate circumferences i.e., NF and DIP on each of the 10 fingers. The sum of the 10 ratios (NF:DIP) determines the DI. A digital index of</p>	

10.2 or higher signifies the presence of clubbing.

As part of the research, we have developed a prototype system called Finger Clubbing Digital Index (DI) Evaluation System for the computation of DI, saving of diagnosis data, and future monitoring of the patient's past medical check-up particulars. The average time taken to measure both NF and DIP circumferences using the device and to compute DI values using the system is $6:36 \pm 1:24$ minutes (Mean \pm SD) with a range of 4 minutes 31 s to 9 minutes 30 s, compared to $35:97 \pm 9:16$ minutes (Mean \pm SD) if using string and calipers.

It is proven that the developed device and its system are able to achieve significant time savings in comparison to the existing measurement device and technique. The developed device and its system have the potential to benefit clinicians and patients as it overcomes the disadvantages of the conventional caliper and string method for finger circumference measurement that may be inefficient, time consuming and impractical for a busy clinic practice.

D. Pencapaian Utama

Key Findings

The developed device and its system are able to achieve significant time savings compared to the existing measurement device.

E, Hasil Penyelidikan

Deliverables

Sila tandakan item yang berkaitan pada senarai berikut:

Please tick the relevant items below:

	Item	Bilangan/Number
	Kertas teknikal/bersiri dalaman <i>Internal technical/serial papers</i>	
	Tesis/disertasi pelajar sarjana <i>Student's Masters thesis/dissertation</i>	
	Tesis pelajar PhD <i>Student's PhD thesis</i>	
	Kertas persidangan tempatan <i>Local conference papers</i>	
	Kertas persidangan antarabangsa <i>International conference papers</i>	
	Makalah dalam jurnal tempatan <i>Local journal papers</i>	
✓	Makalah dalam jurnal antarabangsa <i>International journal papers</i>	1
	Monograf atau buku <i>Book/monograph</i>	

Lain-lain/others (sila nyatakan/*please specify*)

Tesis/disertasi pelajar prasiswazah – 2 tesis



RINGKASAN LAPORAN AKHIR
GERAN PENYELIDIKAN OSAKA GAS
END OF OSAKA GAS
GRANT REPORT SUMMARY

A. Tajuk Projek <i>Project Title</i>	: Soft Error Mitigation in Asynchronous Communication System
Ketua Penyelidik <i>Project Leader</i>	: Norhuzaimin Julai
Fakulti/Institut <i>Faculty/Institute</i>	: Kejuruteraan
Ahli Kumpulan Penyelidik <i>Research Team Members</i>	: Dr Lakshmanan AL Gurusamy
B. Tarikh Geran Diluluskan <i>Grant Approval Date</i>	: 1 Januari 2015
Tempoh Projek <i>Project Duration</i>	: 1 tahun
Peruntukan Yg. Diluluskan <i>Budget Approved</i>	: 4000
Perbelanjaan Terkini <i>Expenditure To-Date</i>	:
C. Pencapaian Keseluruhan <i>Overall Achievement</i> Huraikan pencapaian berbanding objektif, hipotesis serta permasalahan asal yang diselidiki.. <i>Describe the achievements in relation to the original objectives, hypothesis and research problems.</i> The original objective is to design a circuit that can mitigate error due to soft error. The circuit circuit is able to detect and correct errors due to SEU. The functionalities of the solutions have	

been validated by simulation. The findings had been presented in the EnCon 2015 and published in the Applied Mechanics and Material, Volume 833,. P119-125

D. Pencapaian Utama
Key Findings

Novel design of circuits that can detect and correct soft errors.

Norhuzaimin Julai (2016). Soft Error Mitigation on Dual Rail Latch, Applied Mechanics and Material, Volume 833,. P119-125

E, Hasil Penyelidikan
Deliverables

Sila tandakan item yang berkaitan pada senarai berikut:

Please tick the relevant items below:

	Item	Bilangan/Number
	Kertas teknikal/bersiri dalaman <i>Internal technical/serial papers</i>	
	Tesis/disertasi pelajar sarjana <i>Student's Masters thesis/dissertation</i>	
	Tesis pelajar PhD <i>Student's PhD thesis</i>	
	Kertas persidangan tempatan <i>Local conference papers</i>	EnCon2015
	Kertas persidangan antarabangsa <i>International conference papers</i>	
	Makalah dalam jurnal tempatan <i>Local journal papers</i>	Journal Applied Mechanic and Material
	Makalah dalam jurnal antarabangsa <i>International journal papers</i>	
	Monograf atau buku <i>Book/monograph</i>	

Lain-lain/others (sila nyatakan/*please specify*)



RINGKASAN LAPORAN AKHIR
GERAN PENYELIDIKAN OSAKA GAS
END OF OSAKA GAS
GRANT REPORT SUMMARY

A. Tajuk Projek <i>Project Title</i>	: Synthesis of Low Power Fast Adders Using Reversible Logic
Ketua Penyelidik <i>Project Leader</i>	: Dr Lakshmanan AL Gurusamy
Fakulti/Institut <i>Faculty/Institute</i>	: Kejuruteraan
Ahli Kumpulan Penyelidik <i>Research Team Members</i>	: Dr Norhuzaimin Julai
B. Tarikh Geran Diluluskan <i>Grant Approval Date</i>	: 1 Januari 2015
Tempoh Projek <i>Project Duration</i>	: 1 tahun
Peruntukan Yg. Diluluskan <i>Budget Approved</i>	: 4500
Perbelanjaan Terkini <i>Expenditure To-Date</i>	:

C. Pencapaian Keseluruhan

Overall Achievement

Huraikan pencapaian berbanding objektif, hipotesis serta permasalahan asal yang diselidiki..

Describe the achievements in relation to the original objectives, hypothesis and research problems.

The achievement of the project is partially successful.

We were able to develop the Verilog codes for the overall hybrid adder and simulated the output successfully (refer to appendix A)

However, we were not able to substantially reduce the garbage outputs and to reduce the quantum cost and to do a comparison study. The synthesis part of the work is still in progress.

D. Pencapaian Utama

Key Findings

The key finding is that a new and improved Hybrid Prefix adder which is simulated to be bug free and functionally working is proposed (Appendix A).

E, Hasil Penyelidikan

Deliverables

Sila tandakan item yang berkaitan pada senarai berikut:

Please tick the relevant items below:

	Item	Bilangan/Number
	Kertas teknikal/bersiri dalaman <i>Internal technical/serial papers</i>	
	Tesis/disertasi pelajar sarjana <i>Student's Masters thesis/dissertation</i>	
	Tesis pelajar PhD <i>Student's PhD thesis</i>	
	Kertas persidangan tempatan <i>Local conference papers</i>	
	Kertas persidangan antarabangsa <i>International conference papers</i>	
	Makalah dalam jurnal tempatan <i>Local journal papers</i>	



RINGKASAN LAPORAN AKHIR
GERAN PENYELIDIKAN OSAKA GAS
END OF OSAKA GAS
GRANT REPORT SUMMARY

A. Tajuk Projek <i>Project Title</i>	: The Use Of Electromagnetic Energy In The Detection And Identification Of Objects Buried In Various Conditions
Ketua Penyelidik <i>Project Leader</i>	: Dr Kismet Anak Hong Ping
Fakulti/Institut <i>Faculty/Institute</i>	: Engineering
Ahli Kumpulan Penyelidik <i>Research Team Members</i>	: Assoc. Prof. Dr Azhaili Bin Baharun Dr Hushairi Bin Zen Dr Shafrida Binti Sahrani Dr Dayang Azra Binti Awang Mat
B. Tarikh Geran Diluluskan <i>Grant Approval Date</i>	:
Tempoh Projek <i>Project Duration</i>	: 1 Tahun
Peruntukan Yg. Diluluskan <i>Budget Approved</i>	: 4,500.00
Perbelanjaan Terkini <i>Expenditure To-Date</i>	: 4,147.05
C. Pencapaian Keseluruhan <i>Overall Achievement</i>	Huraikan pencapaian berbanding objektif, hipotesis serta permasalahan asal yang diselidiki. <i>Describe the achievements in relation to the original objectives, hypothesis and research problems.</i>

D. Pencapaian Utama***Key Findings***

We have found that the high significant of our algorithm to detect and identify any object that buried in various mediums such as liquid, breast tissues and etc.

E, Hasil Penyelidikan***Deliverables***

Sila tandakan item yang berkaitan pada senarai berikut:

Please tick the relevant items below:

	Item	Bilangan/Number
	Kertas teknikal/bersiri dalaman <i>Internal technical/serial papers</i>	
	Tesis/disertasi pelajar sarjana <i>Student's Masters thesis/dissertation</i>	
	Tesis pelajar PhD <i>Student's PhD thesis</i>	
	Kertas persidangan tempatan <i>Local conference papers</i>	
	Kertas persidangan antarabangsa <i>International conference papers</i>	
	Makalah dalam jurnal tempatan <i>Local journal papers</i>	
	Makalah dalam jurnal antarabangsa <i>International journal papers</i>	3
	Monograf atau buku <i>Book/monograph</i>	

Lain-lain/others (sila nyatakan/*please specify*)



RINGKASAN LAPORAN AKHIR
GERAN PENYELIDIKAN OSAKA GAS
END OF OSAKA GAS
GRANT REPORT SUMMARY

A. Tajuk Projek <i>Project Title</i>	:	PERFORMANCE AND SERVICE LIFE PREDICTION OF LOW-CO₂ ALKALI-ACTIVATED MATERIALS
Ketua Penyelidik <i>Project Leader</i>	:	Dr Idawati Ismail
Fakulti/Institut <i>Faculty/Institute</i>	:	Faculty of Engineering
Ahli Kumpulan Penyelidik <i>Research Team Members</i>	:	Dr Raudhah Ahmadi
B. Tarikh Geran Diluluskan <i>Grant Approval Date</i>	:	2015
Tempoh Projek <i>Project Duration</i>	:	One Year
Peruntukan Yg. Diluluskan <i>Budget Approved</i>	:	RM4,500
Perbelanjaan Terkini <i>Expenditure To-Date</i>	:	RM4,500
C. Pencapaian Keseluruhan Overall Achievement Huraikan pencapaian berbanding objektif, hipotesis serta permasalahan asal yang diselidiki.. <i>Describe the achievements in relation to the original objectives, hypothesis and research problems.</i> A preliminary findings in durability of alkali activated binders are generalized. From this research a basic understanding of performance of these binders are discovered. From microstructural analysis it was found that gel type influence mass concrete performance under chloride conditions. 9 FYP theses were supported by this funding.		

D. Pencapaian Utama
Key Findings

The microstructure characterization of alkali activated binders based on Palm Oil Fuel Ash (POFA) and fly ash as starting precursors and derivation of correlation to their mechanical performance and durability was studied. The findings provide key understanding in improving these materials for real usage in construction industry.

E, Hasil Penyelidikan
Deliverables

Sila tandakan item yang berkaitan pada senarai berikut:

Please tick the relevant items below:

	Item	Bilangan/Number
	Kertas teknikal/bersiri dalaman <i>Internal technical/serial papers</i>	
	Tesis/disertasi pelajar sarjana <i>Student's Masters thesis/dissertation</i>	
	Tesis pelajar PhD <i>Student's PhD thesis</i>	
	Kertas persidangan tempatan <i>Local conference papers</i>	
	Kertas persidangan antarabangsa <i>International conference papers</i>	
	Makalah dalam jurnal tempatan <i>Local journal papers</i>	
	Makalah dalam jurnal antarabangsa <i>International journal papers</i>	
	Monograf atau buku <i>Book/monograph</i>	

Lain-lain/*others* (sila nyatakan/*please specify*)

9 Final Year Projects

Sila senaraikan maklumat (pengarang, tahun, tajuk, jurnal/penerbit, jilid, halaman) bagi penerbitan/tesis yang dihasilkan (jika ada).

Please specify the publications (authors, year, title, journal/publisher, volume, page nos.) (if any)

n/a



RINGKASAN LAPORAN AKHIR
GERAN PENYELIDIKAN OSAKA GAS
END OF OSAKA GAS
GRANT REPORT SUMMARY

A. Tajuk Projek <i>Project Title</i>	: Electrical Power Quality Events Analysis Using Wavelet Transform
Ketua Penyelidik <i>Project Leader</i>	: Shirley Anak Rufus
Fakulti/Institut <i>Faculty/Institute</i>	: Faculty of Engineering (FEng), UNIMAS
Ahli Kumpulan Penyelidik <i>Research Team Members</i>	: AP Dr Azhaili Baharun AP Dr Hushairi Zen Dr Kismet Anak Hong Ping Dr Martin Anyi Puan Nurul 'Izzati Binti Hashim Puan Nazreen Binti Junaidi Encik Mohd Hafiez Izzwan Bin Saad
B. Tarikh Geran Diluluskan <i>Grant Approval Date</i>	: 30 October 2014
Tempoh Projek <i>Project Duration</i>	: 12 months (1 January 2015 – 31 December 2015)
Peruntukan Yg. Diluluskan <i>Budget Approved</i>	: RM3000.00
Perbelanjaan Terkini <i>Expenditure To-Date</i>	: RM0.00
C. Pencapaian Keseluruhan <i>Overall Achievement</i> Huraikan pencapaian berbanding objektif, hipotesis serta permasalahan asal yang diselidiki.. <i>Describe the achievements in relation to the original objectives, hypothesis and research problems.</i> The increasing application of electrical and electronics equipment used in academic building of UNIMAS has caused a big impact on the quality of electrical power. Through observation, it	

was found that the chosen academic building are filled with all kinds of sensitive electronic devices such as personal computers, data networks, security systems, printer, copy machines and central air conditioners which designed only to operate within narrow voltage limit and does not adequate to ride through capabilities to filter out fluctuations in electrical supply. In this research, only the incoming current at Main Distribution Board (MDB) of Energy Laboratory and Non-destructive Energy Laboratory, Faculty of Engineering UNIMAS are monitored and recorded manually using video cameras and power clamp meters and the results of the findings are analysed. Wavelet Transform (WT) analysis approach is carried out by using three (3) types of mother wavelet namely Haar, Symlet, and Daubechies to identify the most suitable mother. Characteristic of the current duration and magnitude are analyzed using Microsoft Excel and Statistical Package for the Social Sciences (SPSS), then compared with Discrete Wavelet Transform (DWT). Result of this research showed the variation of the current that effected by utilization of electronic devices.

D. Pencapaian Utama

Key Findings

One month monitoring process is done to record the current disturbances at Energy Laboratory and Non-destructive Energy Laboratory located at Mechanical ground floor of FEng UNIMAS. Analysis of the sample distorted current are performed using SPSS and Wavelet transform to identify current harmonic and Total Harmonic Distortion (THD).

E, Hasil Penyelidikan

Deliverables

Sila tandakan item yang berkaitan pada senarai berikut:

Please tick the relevant items below:

	Item	Bilangan/Number
<input type="checkbox"/>	Kertas teknikal/bersiri dalaman <i>Internal technical/serial papers</i>	
<input type="checkbox"/>	Tesis/disertasi pelajar sarjana <i>Student's Masters thesis/dissertation</i>	
<input type="checkbox"/>	Tesis pelajar PhD <i>Student's PhD thesis</i>	
<input type="checkbox"/>	Kertas persidangan tempatan <i>Local conference papers</i>	
<input type="checkbox"/>	Kertas persidangan antarabangsa <i>International conference papers</i>	
<input type="checkbox"/>	Makalah dalam jurnal tempatan <i>Local journal papers</i>	
<input type="checkbox"/>	Makalah dalam jurnal antarabangsa <i>International journal papers</i>	
<input type="checkbox"/>	Monograf atau buku <i>Book/monograph</i>	

Lain-lain/others (sila nyatakan/*please specify*)

Student's final year dissertation (Year 2015)



RINGKASAN LAPORAN AKHIR
GERAN PENYELIDIKAN OSAKA GAS
END OF OSAKA GAS
GRANT REPORT SUMMARY

A. Tajuk Projek <i>Project Title</i>	:	Production of Ultrafine Palm-Oil-Fuel-Ash (POFA) Pozzolan using a Simple Wind Tunnel System
Ketua Penyelidik <i>Project Leader</i>	:	Dr Raudhah Ahmadi
Fakulti/Institut <i>Faculty/Institute</i>	:	Faculty of Engineering
Ahli Kumpulan Penyelidik <i>Research Team Members</i>	:	Dr Delsye Teo Ching Lee Dr Idawati Bt Ismail Prof Dr MD Abdul Mannan
B. Tarikh Geran Diluluskan <i>Grant Approval Date</i>	:	1 Januari 2015
Tempoh Projek <i>Project Duration</i>	:	1 tahun, 5 bulan. Sehingga 30 Mei 2016
Peruntukan Yg. Diluluskan <i>Budget Approved</i>	:	RM 4500
Perbelanjaan Terkini <i>Expenditure To-Date</i>	:	RM4440
C. Pencapaian Keseluruhan <i>Overall Achievement</i> Huraikan pencapaian berbanding objektif, hipotesis serta permasalahan asal yang diselidiki.. <i>Describe the achievements in relation to the original objectives, hypothesis and research problems.</i>		

Micro fine sized palm oil fuel ash (POFA) is a new supplementary cementitious material that can increase the strength, durability and workability of concrete. However, production of this material incurs high cost and not practical for the construction industry. This paper investigates a simple methodology of producing micro fine sized POFA by means of a laboratory scale wind tunnel system. The raw POFA obtained from an oil palm factory is first calcined to remove carbon residue, then grinded in Los Angeles abrasion machine. The grinded POFA is then blown in the fabricated wind tunnel system for separation into different ranges of particle sizes. The physical, morphological and chemical properties of the micro fine sized POFA were then investigated using Laser Particle Size Analyzer (PSA), nitrogen sorption and Scanning Electron Microscopy with Energy Dispersive X-ray (SEM-EDX). A total of 32.1% micro fine sized POFA were collected from each sample blown, with the size range between 1-10 micrometer.

D. Pencapaian Utama *Key Findings*

The devised laboratory scale of wind tunnel production system is successful in producing micro fine sized POFA and with modifications, this system is envisaged applicable for used to commercialize micro fine sized POFA production for the construction industry.

E, Hasil Penyelidikan *Deliverables*

Sila tandakan item yang berkaitan pada senarai berikut:

Please tick the relevant items below:

	Item	Bilangan/Number
	Kertas teknikal/bersiri dalaman <i>Internal technical/serial papers</i>	
	Tesis/disertasi pelajar sarjana <i>Student's Masters thesis/dissertation</i>	
	Tesis pelajar PhD <i>Student's PhD thesis</i>	
	Kertas persidangan tempatan <i>Local conference papers</i>	
x	Kertas persidangan antarabangsa <i>International conference papers</i>	1
	Makalah dalam jurnal tempatan <i>Local journal papers</i>	
x	Makalah dalam jurnal antarabangsa <i>International journal papers</i>	1
	Monograf atau buku <i>Book/monograph</i>	

Lain-lain/others (sila nyatakan/please specify)

R& D Expo (Innovation Technology Expo, INTEX 2016) Organized by UNIMAS.



RINGKASAN LAPORAN AKHIR
GERAN PENYELIDIKAN OSAKA GAS
END OF OSAKA GAS
GRANT REPORT SUMMARY

A. Tajuk Projek <i>Project Title</i>	: The Design of Insulated Gate Bipolar Transistor (IGBT) for Solar PV Application.
Ketua Penyelidik <i>Project Leader</i>	: Asrani Lit
Fakulti/Institut <i>Faculty/Institute</i>	: Fakulti Kejuruteraan
Ahli Kumpulan Penyelidik <i>Research Team Members</i>	: Dr Siti Kudnie Sahari Dr Rohana Sapawi Dr Dayang Azra Awang Mat Elizabeth Kho Ching Tee
B. Tarikh Geran Diluluskan <i>Grant Approval Date</i>	:
Tempoh Projek <i>Project Duration</i>	: 1 Tahun (2014 – 2015)
Peruntukan Yg. Diluluskan <i>Budget Approved</i>	: RM 3000
Perbelanjaan Terkini <i>Expenditure To-Date</i>	: RM 0 (The Computing Platform already available in Lab)
C. Pencapaian Keseluruhan <i>Overall Achievement</i>	Huraikan pencapaian berbanding objektif, hipotesis serta permasalahan asal yang diselidiki.. <i>Describe the achievements in relation to the original objectives, hypothesis and research problems.</i>

The overall achievement of the project are listed as below:-

1. Improve switching speed of BJT through doping the emitter region with incorporation of Au and Pt and replace N-substrate with Ge material.
2. Design a high performance of BJT to function efficiently as high power switch.
3. Design a minimum switching loss of high power switch, BJT.

D. Pencapaian Utama

Key Findings

The new design of IGBT with high Voltage Breakdown with more than 220 V.

E, Hasil Penyelidikan

Deliverables

Sila tandakan item yang berkaitan pada senarai berikut:

Please tick the relevant items below:

	Item	Bilangan/Number
	Kertas teknikal/bersiri dalaman <i>Internal technical/serial papers</i>	
	Tesis/disertasi pelajar sarjana <i>Student's Masters thesis/dissertation</i>	
	Tesis pelajar PhD <i>Student's PhD thesis</i>	
	Kertas persidangan tempatan <i>Local conference papers</i>	
	Kertas persidangan antarabangsa <i>International conference papers</i>	
	Makalah dalam jurnal tempatan <i>Local journal papers</i>	
	Makalah dalam jurnal antarabangsa <i>International journal papers</i>	
	Monograf atau buku <i>Book/monograph</i>	

Lain-lain/others (sila nyatakan/*please specify*)

- Undergraduate Thesis



RINGKASAN LAPORAN AKHIR
GERAN PENYELIDIKAN OSAKA GAS
END OF OSAKA GAS
GRANT REPORT SUMMARY

A. Tajuk Projek <i>Project Title</i>	: Modeling Power Quality Performances on Generated Power from Pump as Turbine (PAT) UNIMAS/NC-18.01/09-05(11)
Ketua Penyelidik <i>Project Leader</i>	: Dr. Al Khalid Othman
Fakulti/Institut <i>Faculty/Institute</i>	: Fakulti Kejuruteraan
Ahli Kumpulan Penyelidik <i>Research Team Members</i>	: Dr. Hushairi Zen Mohd Azlan bin Ismail
B. Tarikh Geran Diluluskan <i>Grant Approval Date</i>	: 1 Januari 2015
Tempoh Projek <i>Project Duration</i>	: 12 bulan (lanjutan 6 bulan)
Peruntukan Yg. Diluluskan <i>Budget Approved</i>	: RM4,500.00
Perbelanjaan Terkini <i>Expenditure To-Date</i>	: RM4,500.00
C. Pencapaian Keseluruhan <i>Overall Achievement</i>	<p>Huraikan pencapaian berbanding objektif, hipotesis serta permasalahan asal yang diselidiki.. <i>Describe the achievements in relation to the original objectives, hypothesis and research problems.</i></p> <p>There are large numbers of small, isolated communities living within the inner part of East Malaysia that are unable to gain access to the national transmission grid and have to use</p>

independent power systems to generate their own electricity. The existing high voltage transmission grid coverage is limited to the coastal areas of East Malaysia where big cities are located and does not extend to the inner part of the region. Microhydro has always been the most favourable energy solution for small communities, apart from the diesel generator, the PV panel, and the wind turbine. The microhydro turbines that are commonly used are the Pelton and Crossflow turbines, which are suitable for radial flow.

At present, the existing microhydro projects are funded mainly by the government, by non-profit associations, and by private corporations. High initial cost is the main challenge for most self-funded microhydro users. To address this issue, microhydro users should take advantage of the readily available end suction centrifugal pump and run it in reverse flow to substitute for the traditional hydro turbines. This will eliminate the need to import hydro turbines from abroad, thus rendering the microhydro project more cost-effective and affordable. The use of the PAT as a microhydro mechanical component is widely regarded as the most cost-effective solution.

With that in mind, the aim of this research is to explore the fullest potential of the PAT for microhydro applications by proposing modifications to optimise its operating performance. The exploration starts by outlining the problems relevant to the PAT in relation to the current literature and defining the research direction in line with the current body of knowledge.

The PAT is not designed to run in reverse direction; thus, it has poor hydraulic performance in turbine mode. The flow passage inside a PAT is longer than that of the conventional turbine, thus inducing eddies and turbulence, which increases the total net loss. To date, most PAT users use the original impeller for pump operation, without any modification to the impeller geometry, to suit reverse flow operation. In response, many modifications were proposed to improve the PAT, and researchers have reported these modifications in publications that have been made available to the market. However, there are many types of pumps with a finite number of specific speeds designed to cater to their specific applications. There are countless numbers of pumps of different shapes and sizes.

Extensive studies related to the PAT have shown that the developed prediction models were restricted and limited to defined experiment set-ups, which leads to limited comparison of parameters. Generally, the modifications' effects were predicted and correlated to an explicit range of operations, thus making this subject an open research problem. In addition, the existing prediction models can only predict to a certain level of accuracy, thus limiting the dependability to the prediction models and range of applications

D. Pencapaian Utama ***Key Findings***

Motivated and inspired by the potential benefits of microhydro for rural electrification in East Malaysia and the current state of research on microhydro systems, this project focused on improving the performance of readily available pumps and justifying the economic advantages of this system. The direction, scope of work, and limitations of this study design were influenced by the current condition of microhydro projects in East Malaysia and the recent modification works that were found in the literature review.

In total one PhD thesis, two journals, one conferences and one poster were published as outcomes of the research findings.

In addition, one electric load controller system to test induction generator driven by pump as turbine was designed and developed for teaching and research activities.

E, Hasil Penyelidikan *Deliverables*

Sila tandakan item yang berkaitan pada senarai berikut:
Please tick the relevant items below:

	Item	Bilangan/Number
	Kertas teknikal/bersiri dalaman <i>Internal technical/serial papers</i>	
	Tesis/disertasi pelajar sarjana <i>Student's Masters thesis/dissertation</i>	
	Tesis pelajar PhD <i>Student's PhD thesis</i>	1
	Kertas persidangan tempatan <i>Local conference papers</i>	1
	Kertas persidangan antarabangsa <i>International conference papers</i>	
	Makalah dalam jurnal tempatan <i>Local journal papers</i>	2
	Makalah dalam jurnal antarabangsa <i>International journal papers</i>	
	Monograf atau buku <i>Book/monograph</i>	

Lain-lain/others (sila nyatakan/*please specify*)

Sila senaraikan maklumat (pengarang, tahun, tajuk, jurnal/penerbit, jilid, halaman) bagi penerbitan/tesis yang dihasilkan (jika ada).

Please specify the publications (authors, year, title, journal/publisher, volume, page nos.) (if any)

Journal Publications

Ismail, Mohd Azlan, Othman, Al Khalid, & Zen, Hushairi, 'CFD Modelling of Pump as Turbine at Various Number of Blade for Microhydro System', *Journal of Applied Science & Process Engineering (JASPE)*'.

Ismail, Mohd Azlan, Othman, Al Khalid, & Zen, Hushairi, 'An Experience with Simulation Modelling for Radial Flow Pump' *International Journal of Emerging Engineering Research and Technology*, Vol 3 No. 11, 2015 (ISSN 2349-4395)

Conference Publications

Ismail, Mohd Azlan, Othman, Al Khalid, & Zen, Hushairi, 'The Effect of Rotational Speed to Pump as Turbine Performance for Energy Generation System', Paper presented at 8th Engineering Conference (EnCon), Kuching, Sarawak.