

**LEMBAR HASIL PENILAIAN SEJAWAT SEBIDANG ATAU PEER REVIEW  
KARYA ILMIAH : PROSIDING SEMINAR INTERNASIONAL BEREPUTASI**

Judul Jurnal Ilmiah (Artikel) : Impact of Methanol-Gasoline Fuel Blend on The Fuel Consumption and Exhaust Emission of A SI Engine  
 Jumlah Penulis : Mohamad Rifal, and **Nazaruddin Sinaga\***  
 Status Pengusul : Penulis ke-2  
 Identitas Jurnal Ilmiah : a. Nama Jurnal : The 3rd International Conference on Advanced Materials Science and Technology (ICAMST 2015)  
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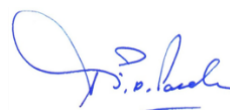
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 NIP 195905071987021001  
 Bidang Ilmu: Teknik Mesin  
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 Institut Teknologi Bandung

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Paper ini membahas efek dari campuran metanol-bensin (M15, M30, M50) pada konsumsi bahan bakar dan emisi dari mesin SI. Pembahasan, hasil, dan ruang lingkup sudah memadai dan sangat baik.

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Prof. Dr. Ir. Ahmad Syuhada, MSc.  
NIP 196108201987031000  
Bidang Ilmu: Teknik Mesin  
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AIP Conference Proceedings

Volume 1725, 19 April 2016, Article number 020070

3rd International Conference on Advanced Materials Science and Technology, ICAMST 2015; Grasia Hotel Semarang; Indonesia; 6 October 2015 through 7 October 2015; Code 121530

**Impact of methanol-gasoline fuel blend on the fuel consumption and exhaust emission of a SI engine** (Conference Paper) ([Open Access](#))

Rifal, M., Sinaga, N.

[View additional authors](#) [Save all to author list](#)

Department of Mechanical Engineering, Diponegoro University, Semarang, Indonesia

[View additional affiliations](#) **Abstract**

In this study, the effect of methanol-gasoline fuel blend (M15, M30 and M50) on the fuel consumption and exhaust emission of a spark ignition engine (SI) were investigated. In the experiment, an engine four-cylinder, four stroke injection system (engine of Toyota Kijang Innova 1TR-FE) was used. Test were did to know the relation of fuel consumption and exhaust emission (CO, CO<sub>2</sub>, HC) were analyzed under the idle throttle operating condition and variable engine speed ranging from 1000 to 4000 rpm. The experimental result showed that the fuel consumption decrease with the use of methanol. It was also shown that the CO and HC emission were reduced with the increase methanol content while CO<sub>2</sub> were increased. © 2016 Author(s).

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Impact of changing compression ratio on engine characteristics of an SI engine fueled with equi-volume blend of methanol and gasoline

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Investigation of the efficiency of sorption-enhanced methanol synthesis process in circulating fast fluidized bed reactors

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# The 3rd International Conference on Advanced Materials Science and Technology (ICAMST 2015)



**Semarang, Indonesia**

6–7 October 2015

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### PRELIMINARY

Full . April 2016

#### **Preface: 3rd International Conference on Advanced Materials Science and Technology (ICAMST 2015)**

AIP Conference Proceedings 1725, 010001 (2016); <https://doi.org/10.1063/1.4945454>



### ARTICLES

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## **Performance of photocatalyst based carbon nanodots from waste frying oil in water purification**

Mahardika Prasetya Aji, Pradita Ajeng Wiguna, Susanto, Nita Rosita, Siti Aisyah Suciningtyas and Sulhadi

AIP Conference Proceedings **1725**, 020001 (2016); <https://doi.org/10.1063/1.4945455>

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Full . April 2016

## **Effect of alloying elements Al and Ca on corrosion resistance of plasma anodized Mg alloys**

Anawati, Hidetaka Asoh and Sachiko Ono

AIP Conference Proceedings **1725**, 020002 (2016); <https://doi.org/10.1063/1.4945456>

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## **Facile synthesis of graphene from graphite using ascorbic acid as reducing agent**

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## **Toughening and strengthening of ceramics composite through microstructural refinement**

Lydia Anggraini, Kazuo Isonishi and Kei Ameyama

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Full . April 2016

## **The effect of tempering temperature on pitting corrosion resistance of 420 stainless steels**

Moch. Syaiful Anwar, Siska Prifiharni and Efendi Mabururi

# Effect of Alloying Elements Al and Ca on Corrosion Resistance of Plasma Anodized Mg Alloys

Anawati<sup>1, 2, a)</sup>, Hidetaka Asoh,<sup>2, 3</sup> and Sachiko Ono<sup>2, 3 b)</sup>

<sup>1</sup>*Dept. Metallurgy and Materials Engineering, Sumbawa University of Technology, Jl. Raya Olat Maras, Dusun Batu Alang, Desa Leseng, Kecamatan Moyo Hulu, Kabupaten Sumbawa, NTB, Indonesia*

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<sup>3</sup>*Dept. Applied Chemistry, Kogakuin University, 2665-1 Nakano, Hachioji, Tokyo, Japan*

<sup>a)</sup>Corresponding author: anawati@uts-sumbawa.ac.id

<sup>b)</sup>sachiono@cc.kogakuin.ac.jp

**Abstract.** Plasma anodizing is a surface treatment used to form a ceramic-type oxide film on Mg alloys by the application of a high anodic voltage to create intense plasma near the metal surface. With proper selection of the process parameters, the technique can produce high quality oxide with superior adhesion, corrosion resistance, micro-hardness, wear resistance and strength. The effect of alloying element Al on plasma anodizing process of Mg alloys was studied by comparing the anodizing curves of pure Mg, AZ31, and AZ61 alloys while the effect of Ca were studied on AZ61 alloys containing 0, 1, and 2 wt% Ca. Anodizing was performed in 0.5 M Na<sub>3</sub>PO<sub>4</sub> solution at a constant current density of 200 Am<sup>-2</sup> at 25°C. Anodic oxide films with lava-like structure having mix composition of amorphous and crystal were formed on all of the alloys. The main crystal form of the oxide was Mg<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub> as analyzed by XRD. Alloying elements Al and Ca played role in modifying the plasma lifetime during anodization. Al tended to extend the strong plasma lifetime and therefore accelerated the film thickening. The effect of Ca on anodizing process was still unclear. The anodic film thickness and chemical composition were altered by the presence of Ca in the alloys. Electrochemical corrosion test in 0.9% NaCl solution showed that the corrosion behavior of the anodized specimens depend on the behavior of the substrate. Increasing Al and Ca content in the alloys tended to increase the corrosion resistance of the specimens. The corrosion resistance of the anodized specimens improved significantly about two orders of magnitude relative to the bare substrate.

## INTRODUCTION

During the last decade, there has been great interests in investigating Mg and its alloys as materials for application in cardiovascular and orthopaedic devices [1-7]. This is due to the unique property of Mg that degrades spontaneously in physiological solutions and due to the proximity of the mechanical properties to that of the natural bone [8]. The dissolved Mg ions are tolerable in human body and beneficial for some metabolic reactions [9]. In many cases of implantation, the body needs a temporary implant or device in which case biodegradable materials represent better than an inert one. Historically, Mg and its alloys have been studied as implant material since 1878 [7], however commercial medical devices are still not available. Mg application was limited due to the relatively poor corrosion resistance when exposed to physiology environment which led to liberation of strong hydrogen gas and loss of mechanical integrity.

SHOW ABSTRACT



Full . April 2016

### **Fixation strength analysis of cup to bone material using finite element simulation**

Iwan Budiwan Anwar, Eko Saputra, Rifky Ismail, J. Jamari and [Emile van der Heide](#)

AIP Conference Proceedings 1725, 020006 (2016); <https://doi.org/10.1063/1.4945460>

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### **Crystal structures and magnetic properties of magnetite (Fe<sub>3</sub>O<sub>4</sub>)/Polyvinyl alcohol (PVA) ribbon**

Harlina Ardiyanti, Edi Suharyadi, Takeshi Kato and Satoshi Iwata

AIP Conference Proceedings 1725, 020007 (2016); <https://doi.org/10.1063/1.4945461>

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Full . April 2016

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AIP Conference Proceedings 1725, 020008 (2016); <https://doi.org/10.1063/1.4945462>

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Full . April 2016

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Dwi Asmi, Ahmad Sulaiman, Irene Lucky Oktavia, Muhammad Badaruddin and Anne Zulfia

AIP Conference Proceedings 1725, 020009 (2016); <https://doi.org/10.1063/1.4945463>

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# Fixation Strength Analysis of Cup to Bone Material using Finite Element Simulation

Iwan Budiwan Anwar<sup>1,2, a)</sup>, Eko Saputra<sup>1,3, b)</sup>, Rifky Ismail<sup>3, c)</sup>, J Jamari<sup>3, d)</sup> and Emile van der Heide<sup>1, 4, e)</sup>

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<sup>e)</sup>E.vanderHeide@utwente.nl

**Abstract.** Fixation of acetabular cup to bone material is an important initial stability for artificial hip joint. In general, the fixation in cement less-type acetabular cup uses press-fit and screw methods. These methods can be applied alone or together. Based on literature survey, the additional screw inside of cup is effective; however, it has little effect in whole fixation. Therefore, an acetabular cup with good fixation, easy manufacture and easy installation is required. This paper is aiming at evaluating and proposing a new cup fixation design. To prove the strength of the present cup fixation design, the finite element simulation of three dimensional cup with new fixation design was performed. The present cup design was examined with twist axial and radial rotation. Results showed that the proposed cup design was better than the general version.

## INTRODUCTION

This research is initiated by previous research which focuses the study in impingement between neck stem surface and liner rim due to human activities [1-3]. Further, the scope of these researches also had been developed into the activity of Salat as special daily activity [4-5]. In the real condition, the impingement process will result in push-force for all hip joint components, in particular for cup component. The cup component will be suppressed in axial or radial direction due to impingement process. Therefore, the focus of this research is to continue the research by investigating the cup fixation.

In general, artificial hip joint in total hip arthroplasty (THA) consists of acetabular cup or cup, acetabular liner or liner, femoral head, and stem. In the THA, cup and stem are component that experiencing direct contact with bone. In order to lock the hip component with bone, the good fixation method is required. Especially for the cup, cemented and cement less methods are widely used in the THA. In this paper, the cup fixation in cement-less method will be discussed.

The cup fixation of cement-less method usually uses press-fit and screw methods. Press-fit involves pressure bonding by differences in elasticity between the acetabulum bone and cup. To obtain it, the diameter of the cup is usually bigger than the reaming diameter of the acetabulum [6]. The screw is widely used to support press-fit

Full . April 2016

## Rotary forcespun styrofoam fibers as a soilless growing medium

Ahmad Fauzi, Dhewa Edikresnha, Muhammad Miftahul Munir and Khairurrijal

AIP Conference Proceedings 1725, 020019 (2016); <https://doi.org/10.1063/1.4945473>

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## Improvement of catalytic activity of Fe<sub>3</sub>O<sub>4</sub>/CuO/TiO<sub>2</sub> nanocomposites using the combination of ultrasonic and UV light irradiation for degradation of organic dyes

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## Structural modification of strontium hexaferrite through destruction process and ionic substitution

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Full . April 2016

## Effect of Mn and Ti substitution on the reflection loss characteristic of Ba<sub>0.6</sub>Sr<sub>0.4</sub>Fe<sub>11</sub>-

# Rotary Forcespun Styrofoam Fibers as a Soilless Growing Medium

Ahmad Fauzi<sup>1</sup>, Dhewa Edikresnha<sup>1</sup>, Muhammad Miftahul Munir<sup>2,3</sup>, and Khairurrijal<sup>1,3,a)</sup>

<sup>1</sup>*Physics of Electronic Materials Research Division*

<sup>2</sup>*Theoretical High Energy Physics and Instrumentation Research Division,  
Faculty of Mathematics and Natural Sciences*

<sup>3</sup>*Research Center for Bioscience and Biotechnology, Institut Teknologi Bandung,  
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<sup>a)</sup> *corresponding authors: krijal@fi.itb.ac.id*

**Abstract.** To make styrofoam fibers from used styrofoam, rotary forcespinning technique was used because it offers high production rate and affordable production cost. The used styrofoam was dissolved in acetone to obtain styrofoam solution as a precursor of styrofoam fibers. Since the technique utilizes centrifugal force, the precursor was thrown out and its phase changed to be solid following acetone solvent evaporation. Long, clean and light styrofoam fibers were then produced. To determine if the styrofoam fibers is a good soilless growing medium, physico-chemical properties including pH and electrical conductivity, bulk density, water retention and wettability were measured. Rockwool, which is the most popular soilless growing medium and easily obtained from local farm suppliers, was selected as a benchmark to evaluate the styrofoam fibers.

## INTRODUCTION

The rapid increase of human population has reduced available farmland due to the conversion of farmland into housing and factories. Therefore, the use of soilless growing media for farming becomes very important to overcome this problem [1-3]. The most popular soilless growing technique is hydroponics using commercially sold soilless growing media, such as rockwool, coconut coir, peat, perlite, and others [4]. On the other hand, styrofoam is a well-known object in daily life; it is clean, light, white, and waterproof, so that it is widely applied as packaging materials, food wrappers, and containers of beverage. Used styrofoam provides major problems because it is very difficult to decompose [5]. If used styrofoam can be applied as a growing medium, then we can help to solve the used styrofoam problem.

Used styrofoam must be formed as styrofoam fibers. We have developed a fibers-synthesis technique that utilizes centrifugal force called as rotary forcespinning (RF). Very recently, we have reported the development of RF and produced fibers [6,7]. This technique has the advantage of high production rate when compared to other fibers production techniques [8]. In addition, the RF technique also offers fairly simple equipment, low production cost, solution or melted precursors [9], and good, long, continuous and small diameter fibers [10]. There are several parameters affecting morphology of the resulting fibers including the speed of rotation, diameter of needle, the distance between needle tip to collector, environmental parameters, and parameters of solution or melted precursors [11].

A soilless growing medium must have several properties so that it can be used to grow plants well. It must be made from a light material so that it can be easily moved and lifted up, it must have good drainage so that the need of water and air to the roots of plants can be fulfilled, and it must also have adequate mechanical strength to support plants [1]. In this paper, we will report the production of styrofoam fibers from used styrofoam using the RF

Full . April 2016

## **The synthesis and characterization of Mg-Zn-Ca alloy by powder metallurgy process**

Dhyah Annur, Franciska P. L., Aprilia Erryani, M. Ikhlusal Amal, Lyandra S. Sitorus and Ika Kartika

AIP Conference Proceedings **1725**, 020032 (2016); <https://doi.org/10.1063/1.4945486>

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## **The tensile strength properties of CFRPs and GRRPs for Unnes electric car body material**

Muhammad Khumaedi, Wirawan Sumbodo and Rahmat Doni Widodo

AIP Conference Proceedings **1725**, 020033 (2016); <https://doi.org/10.1063/1.4945487>

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## **Radial forces analysis and rotational speed test of radial permanent magnetic bearing for horizontal axis wind turbine applications**

Kriswanto and Jamari

AIP Conference Proceedings **1725**, 020034 (2016); <https://doi.org/10.1063/1.4945488>

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## **Polarity enhancement in high oriented ZnO films on Si (100) substrate**

Robi Kurniawan, Eka Nurfani, Shibghatullah Muhammady, Inge M. Sutjahja, Toto Winata, [Andrivo Rusydi](#) and Yudi Darma

AIP Conference Proceedings **1725**, 020035 (2016); <https://doi.org/10.1063/1.4945489>

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Full . April 2016

## **Removal of vertigo blue dyes from Batik textile wastewater by adsorption onto activated carbon and coal bottom ash**

Kusmiyati, Puspita Adi L., Deni V., Robi Indra S., Dlia Islamica and M. Fuadi

# Polarity Enhancement in High Oriented ZnO films on Si (100) Substrate

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**Abstract.** Zinc oxide films with hexagonal crystal structures have been grown on Si substrate (100) using the DC-unbalanced magnetron sputtering at temperature of 300°C with growth time variation. The films have been characterized using X-Ray Diffraction and Fourier Transform Infrared measurement to show the crystal parameter and atomic bonding. The results show that the films have a dominant orientation in the hkl plane (002), while peak positions are shift to lower diffraction angle with addition of growth time. In addition, the bonding between Zn and O atoms (Zn-O) tend to be weaker as indicated by transmittance peak shifting to lower energy. The weakening of Zn-O bonding is due to the contribution of addition of bond length. These conditions make the films tend to have a high polarity. Further analysis of these studies will bring us to have a good understanding to explain the ferroelectric properties of the ZnO films.

## INTRODUCTION

Zinc oxide (ZnO) is a semiconductor material that is interesting to study because it has a high potential for wide range of applications, such as piezoelectric,<sup>1</sup> solar cell,<sup>2</sup> transparent thin film transistor<sup>3</sup> and spintronic application.<sup>4</sup> Hexagonal wurtzite ZnO is the most stable structure at room temperature compared with other structures, cubic rocksalt and cubic zinc blende. It has a crystallographic parameters  $a = 3.2495 \text{ \AA}$ ,  $c = 5.2069 \text{ \AA}$  ( $\alpha = \beta = 90^\circ$ ,  $\gamma = 120^\circ$ )<sup>5</sup> and space group  $P6_3mc$  (186) with Zn and O atoms have atom position of (x, y, z) at (0.333, 0.667, 0) and (0.333, 0.667, 0.38), respectively and both of Zn and O atoms have Wyckoff position on  $2b$ .<sup>6</sup>

One of the interesting research topics today is led multiferroic properties in ZnO. Multiferroicity in the material is an interesting topic to study because it has a high potential for wide range of applications. Multiferroic properties come from the coupling between multiple ferroic properties in a material, such as ferromagnetic, ferroelectric and ferroelastic properties. Ferroic properties have advantages compared to other properties in the material because it is permanent and appear spontaneously.<sup>7</sup> Ferromagnetic materials are widely used as a memory storage device,<sup>8-10</sup> which have been developed using the magneto-optic principles.<sup>11, 12</sup> Ferroelectric materials have been developed as a memory storage devices<sup>13, 14</sup> and ferroelastic material used for a variety of sensors.<sup>15, 16</sup>

The example of multiferroic is magnetoelectric which is used for data storage device.<sup>17-20</sup> Magnetoelectric come from ferromagnetic and ferroelectric coupling due to polarization phenomenon in the material.<sup>21</sup> Polarization in the material appear because the bond between the atoms is elastic and easy to change when applied the external field depending on the field direction. The materials with non-centrosymmetric structure is a material that has a high polarity because the vector sum of dipole moments in each unit cell is  $\sum \mu \neq 0$ .<sup>22</sup> The polarization phenomenon causes displacement and dimensional changes cumulatively in the material. Dimensional changes in the material caused by the polarization phenomenon can be expressed by

$$x \sim QP^2 \quad (1)$$

where  $x$  is the dimensional change in the material,  $P$  is the polarization in the material and  $Q$  is the coefficient.<sup>21</sup>

ZnO has a non-centrosymmetric structure which promises to bring out the multiferroic properties. It has multiferroic properties in specific conditions. Mutual ferromagnetic-ferroelectric coupling appear in Cu-doped ZnO films with maximum polarization is  $0.78 \mu\text{C cm}^{-2}$ ,<sup>23</sup> while relaxor ferroelectricity and magnetoelectric coupling appears in ZnO-Co nanocomposite thin films.<sup>24</sup> The ferroelectric properties of ZnO can be generated by controlling the polarity of the ZnO during the fabrication process where the chamber pressure and deposition power of about  $5 \times 10^{-6} - 8 \times 10^{-2}$  mbar and 10 – 110 W, respectively.<sup>25, 26</sup> Here we report a technique to enhance polarity in ZnO films by controlling the



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### **Influence Al doped ZnO nanostructure on structural and optical properties**

Ari Handono Ramelan, Sayekti Wahyuningsih, Uswatul Chasanah and Hanik Munawaroh

AIP Conference Proceedings **1725**, 020068 (2016); <https://doi.org/10.1063/1.4945522>

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Full . April 2016

### **The result of synthesis analysis of the powder TiO<sub>2</sub>/ZnO as a layer of electrodes for dye sensitized solar cell applications**

Lilis Retnaningsih and Lia Muliani

AIP Conference Proceedings **1725**, 020069 (2016); <https://doi.org/10.1063/1.4945523>

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Full . April 2016

### **Impact of methanol-gasoline fuel blend on the fuel consumption and exhaust emission of a SI engine**

Mohamad Rifal and Nazaruddin Sinaga

AIP Conference Proceedings **1725**, 020070 (2016); <https://doi.org/10.1063/1.4945524>

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Full . April 2016

### **Crystallinity and thermal resistance of microcrystalline cellulose prepared from manau rattan (*Calamusmanan*)**

Raden Reza Rizkiansyah, Mardiyati, Steven and R. Suratman

AIP Conference Proceedings **1725**, 020071 (2016); <https://doi.org/10.1063/1.4945525>

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# The 2015 International Conference on Advanced Materials Science and Technology (ICAMST 2015)



Friday, 3 January 2020

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