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NIP. 19710813 1995121001
Unit Kerja: FSM Universitas Diponegoro
Bidang Ilmu: Fisika

Reviewer 2

Dr. Eng. Eko Hidayanto
NIP. 197301031998021001
Unit Kerja: FSM Universitas Diponegoro
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2. **<u>Ruang lingkup dan kedalaman pembahasan:</u>**
   Pada artikel ini dibahas mengenai potensi titanium dioksida ($TiO_2$) didoping nitrogen (N) sebanyak 8% sebagai fotokatalis untuk degradasi polutan organik dalam limbah air. Metode sol-gel dengan deposisi spray coating digunakan untuk membuat film tipis TiO2:N 8%. Efisiensi degradasi yang dihasilkan cukup baik pada film tipis $TiO_2$:N 8%. Paper ini juga dilengkapi dengan referensi pada bagian pembahasan untuk menguatkan diskusi.
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| **Total = (100%)** | **40** | | | **39** |
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   Isi dalam artikel sesuai, akurat dan komprehensif dengan semua unsur yang terdapat di dalamnya, seperti abstrak, pendahuluan, prosedur eksperimen, hasil dan pembahasan, kesimpulan, dan daftar pustaka.
2. **Ruang lingkup dan kedalaman pembahasan:**
   Artikel ini membahas mengenai potensi titanium dioksida (TiO2) didoping nitrogen (N) sebanyak 8% sebagai fotokatalis untuk degradasi polutan organik dalam limbah air. Metode sol-gel dengan deposisi spray coating digunakan untuk membuat film tipis TiO2:N 8%. Karakterisasi sifat optik dan aktivitas fotokatalis TiO2:N 8% diuji menggunakan spektrofotometer UV-Vis. Hasil menunjukkan efisiensi degradasi yang lebih baik pada film tipis TiO2:N 8% yang dibahas secara mendalam dan mudah dipahami.
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# Effect of annealing temperature on optical properties and photocatalytic properties of $TiO_2$:N 8% thin film for rhodamine B degradation

Pandiangan, Ike Fetty Dayanti ; Sutanto, Heri ; Nurhasanah, Iis
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[a] Department of Physics, Faculty of Science and Mathematics, Diponegoro University, Jalan Prof. Soedarto, Tembalang, Semarang, Central Java, Indonesia



## Abstract

Titanium dioxide ($TiO_2$) is a widely studied photocatalyst for the degradation of organic pollutants from wastewater. This semiconductor is more potential than other semiconductors because of its stability, non-toxic, low cost, and commercial availability. A thin film of $TiO_2$:N 8% was deposited on a glass

substrate using a sol-gel method with a spray coating deposition at a temperature of 450 °C. Precursors used in the synthesis of $TiO_2$:N 8% are titanium (IV) isopropoxide (TTiP), 2-propanol, acetic acid, methanol, and urea as the source of nitrogen doping. Thin film $TiO_2$:N 8% of subsequent deposition results at annealing at temperatures 400 °C, 500 °C, and 600 °C. Optical properties of $TiO_2$:N 8% were tested using a UV-vis spectrophotometer at 200-500 nm wavelength range. The photocatalytic properties of $TiO_2$:N 8% thin films were tested by degradation of a solution of Rhodamine B (RhB) 10 ppm using sunlight and UV C light for 3 h. The energy gap in thin film $TiO_2$:N 8% sequentially from Without Annealing, Annealing 400 °C, Annealing 500 °C, Annealing 600 °C has a value of 3.28 eV; 3.26 eV; 3.08 eV; and 2.95 eV, respectively. The material $TiO_2$:N 8% without annealing has a grain shape having a diameter of 0.5 μm to 1 μm, while for $TiO_2$:N 8% annealing 400 °C has the same grain shape without annealing. The composition of nitrogen atoms in the $TiO_2$:N sample of 8% by 0.2%. The efficiency of degradation shows the properties of $TiO_2$:N 8% photocatalyst with annealing for the better. The degradation process using 400 °C annealing temperature yields a thin film $TiO_2$:N 8% with better properties under UV C lamp of 89.22% in 180 min. Annealing temperature increase yields $TiO_2$:N 8% thin film with improved photocatalyst properties in sunlight with an annealing temperature of 600 °C at 79.30% in 180 min. 

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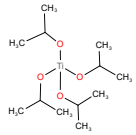

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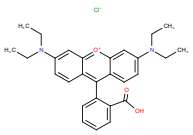

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**Dr Yi Cao** received his bachelor's degree in 2001 and Master's degree (Supervisor: Prof.

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**Judy Wu, University of Kansas, USA**

**Dr Judy Wu** is a Distinguished Professor of Physics at the University of Kansas. She received her PhD from the University of Houston. She is an experimental condensed matter physicist and is specialized in fabrication, characterization and device applications of thin films and nanostructures. Her current research focuses on understanding the interfaces in ultrathin metal-insulator-metal tunnel junctions including Josephson tunnel junctions, magnetic tunnel junctions, memristors for quantum and neuromorphic computing, and in graphene-based heterostructures nanohybrids quantum sensors including photodetectors, strain/bio/gas/chemical sensors.

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Paper

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Md Rakibuddin and Haekyoung Kim*

School of Materials Science and Engineering, Yeungnam University, Gyeongsan, Republic of Korea;

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**Abstract**

Biogenic reduction of metal precursors to corresponding metal nanoparticle (NP) is growing interest among scientists. In the present study, we explore the use of common cheap apple, orange, and aloe vera juices for the synthesis of industrially important stable palladium (Pd) NPs in a rapid room–temperature method without using any external surfactants or capping agents. The formation of Pd NPs is confirmed by powder X-ray diffraction (PXRD), X-ray photoelectron spectroscopy, and ultraviolet–visible spectroscopy. Transmission electron microscopic images clearly show that the spherical Pd NPs have a uniform size distribution in the ranges of 2-25 nm depending on the type of juice. The Pd NPs obtained using apple (Pd–Aj) and orange juices (Pd–Oj) are more uniform and smaller in size than those obtained using aloe vera juice (Pd–Av). The sugars and polyols (with OH–groups) of the juices act as stabilizers of the Pd NPs as confirmed by thermogravimetric and Fourier transform infra–red analyses. Furthermore, the as–synthesized Pd NPs exhibit size−dependent SERS activities and are suitable for lower–level detection ($10^{-6}$ M) of environmentally harmful methylene blue dye in water.

**Keywords**

Green synthesis; Fruit juice; biogenic reduction; Pd nanoparticles; SERS activity

## 1. Introduction

Nanomaterials have received tremendous amounts of attention in science and technology over the past three decades owing to their unique and novel physico-chemical properties that are different from those of their bulk counterparts [1]. Over the years, various chemical methods have been developed

# Study of Thermo luminescence Performance Under UV excitation of Aluminates Based Phosphor

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Abstract – Characterization and wide study of thermoluminescecne and photoluminescence response of a $Y_3Al_5O_{12}$ *phosphor with* $Mn^{2+}$ has been reported here. Different concentration of $Mn^{2+}$ activated $Y_3Al_5O_{12}$ phosphor prepared by the combustion method at $500^0$C.Crystal structure of prepared phosphor were investigated by XRD and FTIR the optical properties investigated by UV-VIS spectroscopy. The photoluminescence excitation and emission spectra band exist at 388nm. The thermoluminescecne sensitivity observed when a wide range of UV excitation at 5,10,15,20 and 25 minutes and after 15 minutes saturation occurred. Further detailed TL parameters kinetic order, activation energy and frequency factor calculated by the de convoluted curve. Therefore various study factors shows that Mn doped phosphor is suitable and compatible for the solid state lighting devices and may be dosimeter purpose.

Keywords : Thermo luminescence, phosphor XRD.

## Introduction

The discussion on a commercially important phosphor namely $Mn^{2+}$ doped aluminate was presented on the basis of its luminescent, optical and structural properties. It was observed that the properties of this phosphor are suitable for futuristic applications in solid state lighting