INTRODUCTION APPROACHES AND METHODOLOGY

Oleh:

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Klinik penulisan artikel ilmiah Internasional

Makasar, 25-27 Juli 2019

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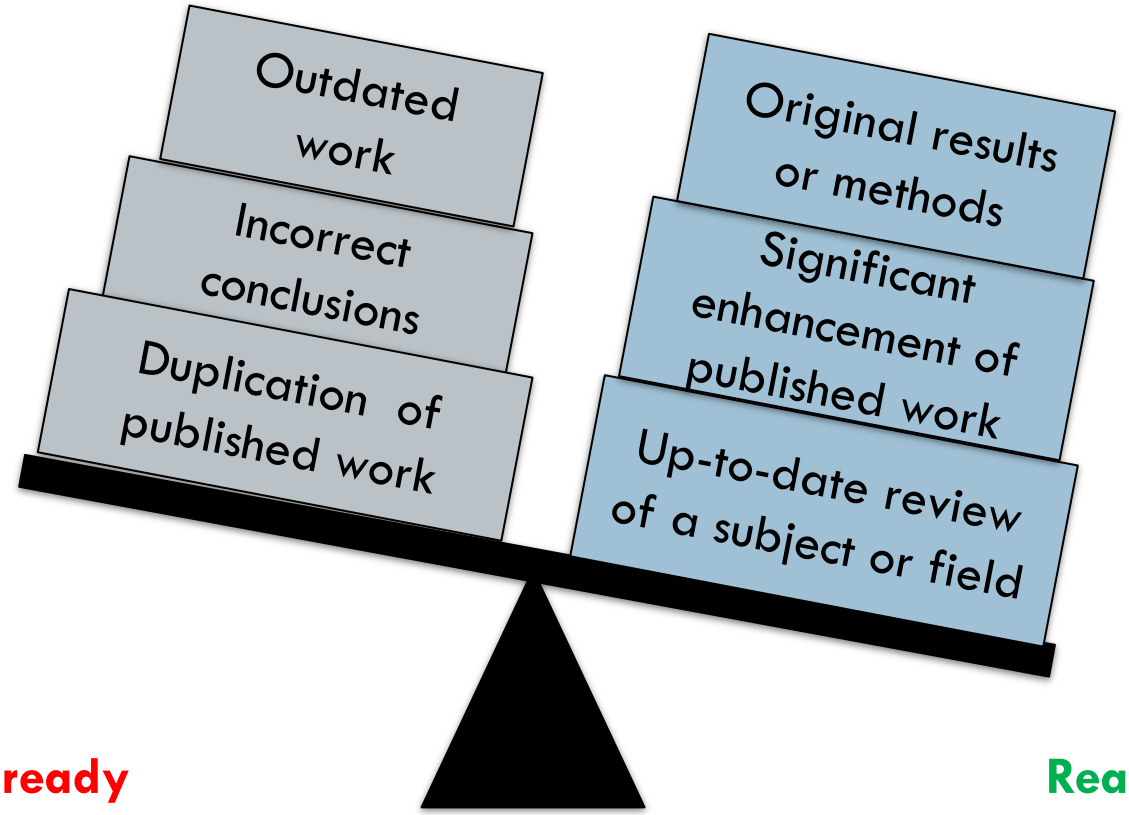


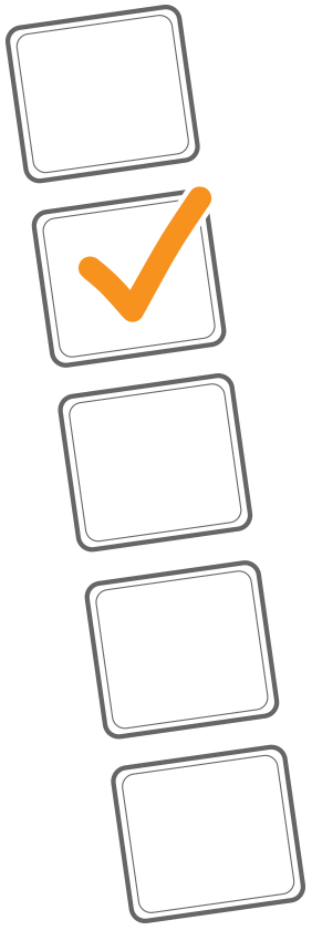
Not ready

Work has no scientific interest

Ready

Work advances the field

WHAT MAKES A STRONG MANUSCRIPT?



- A **clear**, **useful** and **exciting** message,
- presented and constructed in a **logical** manner allowing readers to easily grasp the **significance**.

Editors, reviewers and readers all want to receive well presented manuscripts.

A COMMON FORMAT FOR JOURNAL ARTICLES: IMRAD

Introduction: What was the question?

Methods: How did you try to answer it?

Results: What did you find?

And

Discussion: What does it mean?

STRUCTURE

- Title
- Abstract
- Keywords

Search & find

- **Introduction**
- **Methods**
- Results and Discussion

Tell your story

- Conclusion
- Acknowledgements
- References
- Supp materials

Provide context

RISTEKDIKTI

PURPOSES OF THE INTRODUCTION

To provide background

- In order to help readers understand the paper
- In order to help readers appreciate the importance of the research

- To identify the question(s) the research addressed
- Sometimes stated as a hypothesis

The introduction should answer the following questions:

1. What was I studying?
2. Why was this an important question?
3. What did I know about this topic before I did this study?
4. What model was I testing? and
5. What approach did I take in this study?

INTRODUCTION- *SETTING THE SCENE*

- Brief background information of the current study
- Focused
- Integrated review of pertinent work
- Updated literature citation
- Should not be too long
- Importance of current study/advancement needed/summary of new findings

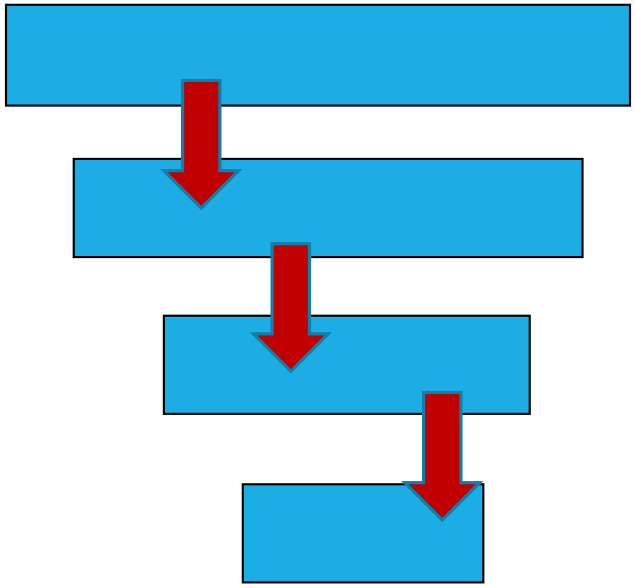
INTRODUCTION TIPS

Tell the reader:

- Why your research was **needed**
- Why does it **matter** to researchers
- Were there any **controversies** you were trying to address?
- What did you do that was **new or innovative**?

without giving away any results or conclusions

- Begin with the broadest scope and get progressively narrower, leading steadily to the statement of objectives in the last sentence or paragraph of the Introduction.



STRUCTURE OF THE INTRODUCTION

Introduction typically should be funnel-shaped, moving from general to specific

A common structure:

- Information on importance of topic
- Highlights of relevant previous research
- Identification of unanswered question(s)
- Approach you used to seek the answer(s)

(In some fields) your main findings

Introduction: Good Practice Points

- Paragraph 1: Context—Explain why this research is important to public, science, or technology; Tell the readers why this topic is an important one to study
- Paragraph 2: Gaps—Describe what gaps exist in the knowledge base that this research was designed to address; Explain the scientific "hole" in knowledge or controversy that this research is attempting to fill or solve
- Paragraph 3: Hypothesis being tested—Explain what you set out to do and why (what is the hypothesis to be tested?).
- Keeps with the rules of good writing and is written using **active rather than passive tense**

Materials

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Subject Area and Category	Materials Science Materials Science (miscellaneous)
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Coverage	2009-ongoing

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H Index

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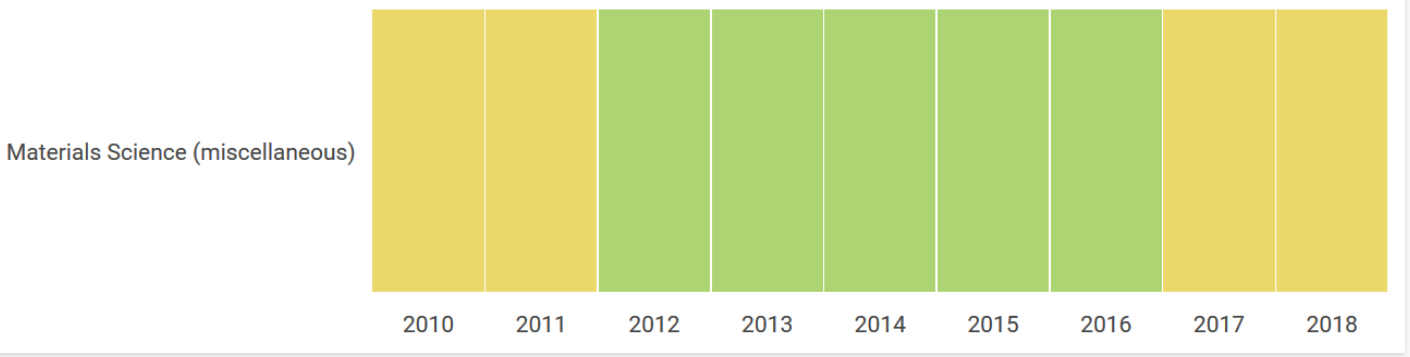

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Go to:

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Journal of Hazardous Materials

Volume 177, Issues 1–3, 15 May 2010, Pages 126-130

reas

Removal of lead(II) from aqueous solutions using carbonate hydroxyapatite extracted from eggshell waste

Dexiang Liao [a], Wei Zheng [b], Xiaoming Li [b], Qi Yang [b], Xiu Yue [b], Liang Guo [b], Guangming Zeng [b]

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ELSEVIER

Ecotoxicology and Environmental Safety

Volume 132, October 2016, Pages 224-230

Remediation of lead contaminated soil by biochar-supported nano-hydroxyapatite

Zhangmei Yang [a, b], Zhanqiang Fang [a, b] ✉, Liuchun Zheng [a, b], Wen Cheng [a, b], Pokeung Eric Tsang [b, c], Jianzhang Fang [a, b], Dongye Zhao [d]

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https://doi.org/10.1016/j.ecoenv.2016.06.008

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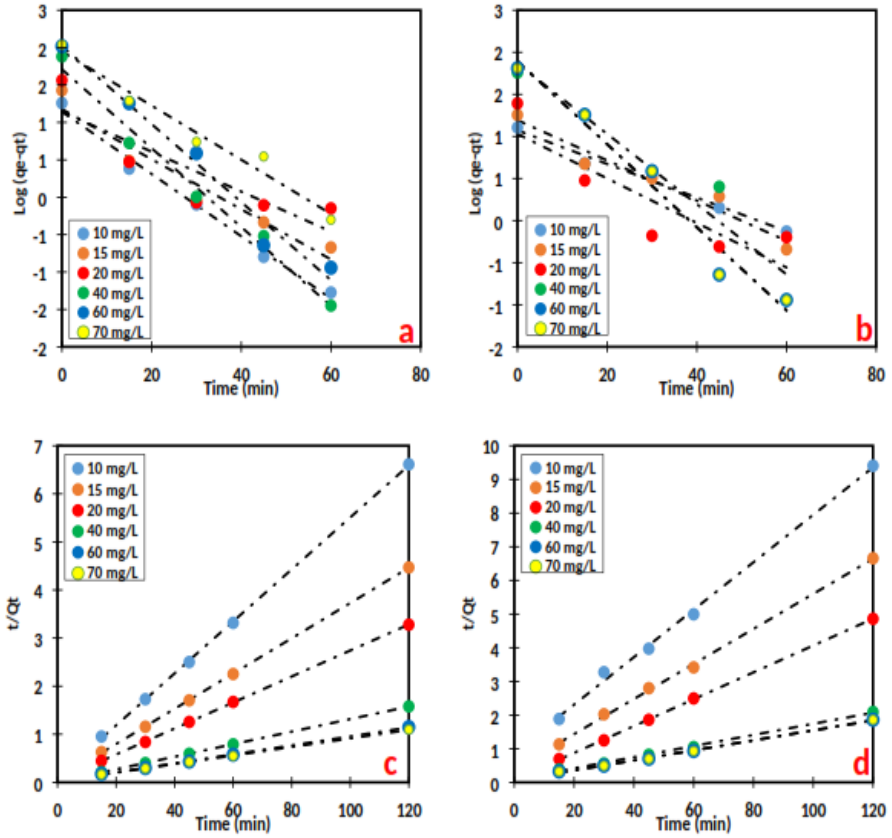
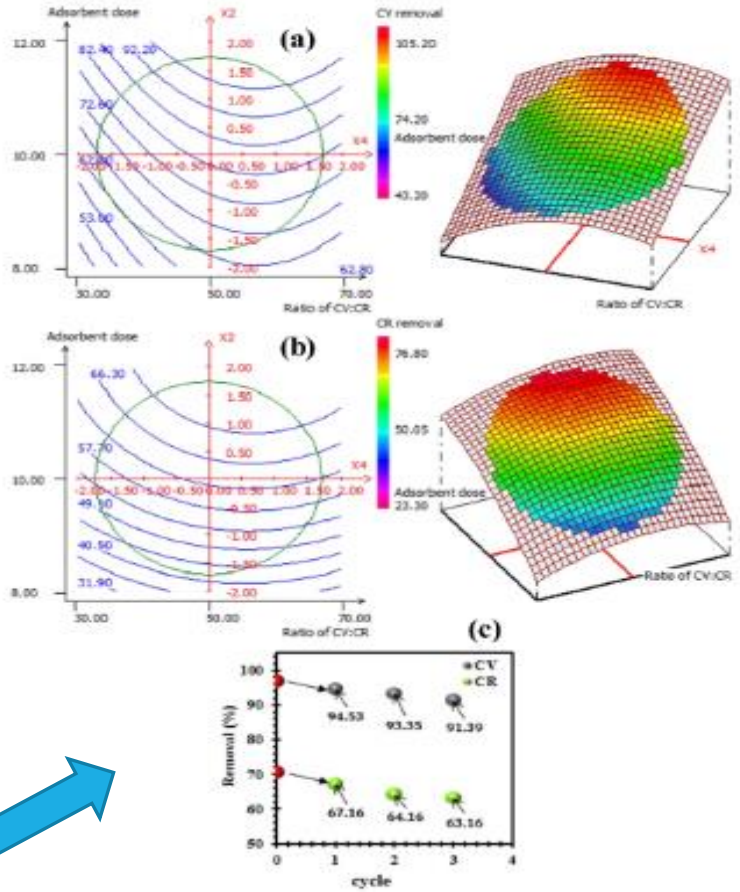


589 **Fig. 4.** Linearized form of a) Pseudo-first-order model of CV (with CR) b) Pseudo-first-order



CENTRAL COMPOSITE DESIGN- RESPON SURFACE METHODOLOGY (CCD-RSM)

RSM (3D) and contour plot presentations (2D) of a) CV , b) CR and c) re

INTRODUCTION

- Explain the problem
- Describe your approach
- Mention existing solutions and limitations

Chemical Engineering Journal 168 (2011) 420–425

One-step synthesis of gold nanocatalysts on a microstructured paper matrix for the reduction of 4-nitrophenol

Hirotaka Koga*, Takuya Kitaoka

1. Introduction

The drive towards a sustainable chemical industry has resulted in a variety of research publications into the development of high-performance catalytic materials which can promote desired reactions more effectively and selectively [1–3]. In particular, intensive research and development into metal nanoparticles (NPs) has been conducted, to investigate the use of new catalysts with large surface area to volume ratios [4–6]. In most cases, the electronic properties of the NPs significantly differ from those of the corresponding bulk metals, leading to a large enhancement in the resulting catalytic activity [1,4]. For example, gold (Au) nanocatalysts have attracted considerable interest for a variety of reactions such as the reduction of 4-nitrophenol (4-NP) in the liquid phase [7,8], low-temperature carbon monoxide (CO) oxidation and propylene epoxidation [9,10] in the gas phase, even though bulk Au is typically regarded as an ineffective catalyst. However, metal NPs easily aggregate, due to their high surface energy, resulting in a remarkable reduction in their original catalytic activities. Hence, catalytic NPs are generally immobilized onto a variety of supports including polymers [7,11] and metal [16]. Kuroda et al. have reported that AuNPs, directly deposited on poly(methyl methacrylate) (PMMA) beads of an average diameter of 2.6 μm, showed a higher catalytic reactivity for the aqueous reduction process of 4-NP to 4-aminophenol (4-AP) when compared with polymer-supported AuNPs previously reported [7]. This suggests that having the AuNPs exposed on the support surface is an essential requirement to achieve excellent reaction efficiency. Meanwhile, Dotzauer et al. demonstrated the immobilization of AuNPs within porous alumina membranes, through the layer-by-layer adsorption of polyelectrolytes and AuNPs [17]. However, this method can lead to a decrease in the reaction efficiency due to the partial coverage of the AuNPs by the polyelectrolytes. Thus, the challenge exists to develop a more efficient, practical immobilization technique that allows highly active metal nanocatalysts to be exposed and fixed onto easy-to-handle matrices.

In our previous reports, the direct in situ synthesis of a variety of metal NPs was accomplished using an easy-to-handle paper

• • •

In the present study, the "on-paper synthesis" of AuNPs was performed, and the as-prepared AuNPs@ZnO paper was used in the aqueous reduction process of 4-NP to investigate its possible applications in liquid-phase catalytic reactions. The catalytic performance of the AuNPs@ZnO paper was compared with conventional Au/ZnO powders.

Removal of Procion Red MX-5B from songket's industrial wastewater in South Sumatra Indonesia using activated carbon-Fe_3O_4 composite

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Activated carbon
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Composite

ABSTRACT

Songket is traditional costume in South Sumatra, Indonesia. This study investigates the feasibility of using activated carbon-Fe_3O_4 composite to adsorb the Procion Red MX-5B dye from songket's industrial wastewater. The adsorbent was characterized using the surface area analyzer, X ray Diffraction, Scanning Electron Microscopy, Energy Dispersive X-ray Analysis, Fourier Transform Infrared and Vibrating Sample Magnetometer. The effects of pH, weight of composite and the contact time were evaluated to determine the adsorption efficiency. The kinetic and isotherm were carried out to evaluate the adsorption behavior of composite. The toxicity level of songket's industrial wastewater was measured using Tilapia fishes as the biological indicator. The 24-h LC50 was calculated using Probit analysis method. The results show that the adsorption process of Procion Red MX-5B using activated carbon-Fe_3O_4 composite follows a pseudo first order kinetic and the experimental data show a good correlation with Freundlich isotherm. Songket's industrial wastewater has the 24-h LC_{50} for Tilapia of 5.6% ± 0.6. After treatment using activated carbon-Fe_3O_4 composite at pH 6 and contact time of 50 min, the adsorbent can reduce concentration of the Procion Red MX-5B by 94% and chemical oxygen demand by 96%. The experimental results indicate that the activated carbon-Fe_3O_4 composite is effective as an adsorbent for the treatment of songket's industrial wastewater.

1. Introduction

Songket is the cultural heritage of Indonesia, particularly in South Sumatra. Songket is used as cloth by the people of South Sumatra for parties, traditional ceremonies and other official events. Currently, the songket industry is a domestic industry that is growing in the community of South Sumatra [1]. The process of songket manufacture consists of several stages of dyeing, weaving and finishing. The dyeing process produces wastewater containing synthetic dye. The dyes used in the dyeing process are the azo classification (−N=N−). The Azo compounds can be bonded with aromatic or aliphatic compounds [2]. Aromatic-azo compounds are stable and have light colors. The azo dyes also act as a reactive dye. Reactive groups which form part of the dye are easily separated. The dye often used in the dyeing process of songket industry is the Procion Red MX-5B dye [3]. The Procion Red MX-5B dye is classified as aromatic-azo which has the molecular formula $C_{19}H_{10}Cl_2N_6S_2Na_2O_7$.

The presence of a synthetic dye in water can impede the penetration of sunlight into the water and reduce the supply of oxygen in the water. Decomposition of azo dyes by bacteria can produce aromatic amine compounds which are by far more toxic than the dye itself [4]. The azo dye when discharged in water, can survive long enough and accumulate, this accumulation has toxic effects on aquatic organisms [5]. In addition, it is a carcinogenic substance which stimulates the growth of cancer [6].

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starting a broad scope

The main problem

Some characteristics of songket's industrial wastewater include the following; it is made of synthetic dye, chemical oxygen demand (COD) in high content and low pH. The concentration of Procion Red MX-5B from one of the songket's industrial wastewater in South Sumatra is 1237 mg L^{-1}, COD is 3820 mg L^{-1}, and pH is 5.8. Therefore, songket's industrial wastewater treatment is necessary prior to its discharge to the environment. The wastewater treatment using magnetic materials is an efficient method to remove pollutant. The advantage of this method of rapid adsorption and separation processes is that it can be performed quickly using a permanent magnet, without requiring any filtration. One of the magnetic materials that effectively act as the adsorbent is magnetite (Fe_3O_4), which has a superparamagnetic property [7,8]. The nanomagnetic ability of Fe_3O_4 has been used to adsorb the Procion Red MX-5B [3], heavy metals include Cu(II), Cr(VI), Ni(II) and Cd(II) [9]. To increase the adsorption capacity, the modification is performed between two or more adsorbents called composite. In recent years, many researchers have developed magnetic composite, for example, magnetic rectorite/magnetite for the adsorption of Methylene Blue and Methyl Orange [10], chitosan coated magnetic hydroxyapatite for the adsorption of Reactive Blue dye [11], and zeolite/magnetic that reduces Cu(II) [12]. The magnetic properties of the composite are more easily attracted by a magnet.

Activated carbon is an excellent adsorbent for wastewater treatment because of its high adsorption capacity, large surface area, high surface reactivity degree and low cost [13,14]. Palm shells have the main content of cellulose and hemicellulose component [15], so it can be used as raw material for activated carbon. The palm shell is the largest part of the palm oil industrial waste. In Indonesia on 2016, the palm field reached 11.9 Mha with a total production of 33.2 Mt of oil palm fruit [16].

The purpose of this study is to prepare activated carbon with Fe_3O_4 to adsorb Procion Red MX-5B and carry out toxicity tests on fish from songket's industrial wastewater. Toxicity test used to determine the negative effects of a substance to biota (LC_{50}), which is the value of the toxic substance exposure concentration that causes 50% mortality of the total biota tested [17]. In this study, toxicity test of songket's industrial wastewater was performed using Tilapia fish as test animal. Tilapia is used as test animals because they have the capability of surviving in poor water quality with low oxygen levels and low or high pH [18]. Tilapia fish is also consumed as a food source for humans.

RISTEKDIKTI

ESTABLISH THE CONTEXT, BACKGROUND AND/OR IMPORTANCE OF THE TOPIC

PRESENT AN ISSUE, PROBLEM, OR CONTROVERSY IN THE FIELD OF STUDY

1. Introduction

In recent years wastewater containing dyes are becoming a major source of environmental pollution in terms of harmful effects on the aquatic environment, as well as, on human health [1–3]. Congo red (CR) and Crystal violet (CV) are two examples of these hazardous dyes. The CR is a benzidine based anionic dye which is widely used in textiles, paper, printing and dyeing industries [4], whereas the CV, which belongs to triphenylmethane group is widely used as an animal medicine in veterinary [5]. To remove these dyes from aqueous solution, the adsorption method is the most used, due to its efficiency, relatively low cost and easy handling [6]. Furthermore, to increase the rate transfer of compounds target and mass, researchers have reinforced the adsorption process by using sonochemistry based on mechanical consequences of sound instead of using classic adsorption based on agitation [7,8].

Regarding binary competitive adsorption of both dyes on the same adsorbent, little work was reported in litterature [9,10]. However, the optimization of adsorption in binary system by

HIGHLIGHTING A KNOWLEDGE GAP IN THE FIELD OF STUDY

Introduction

Water pollution by heavy metals is one of the biggest environmental problems in last decades. Heavy metals are considered to be stable pollutants and they can accumulate in aquatic flora and fauna and consequently easily enter to the food chain. The inclusion of heavy metals in the food chain shows a number of adverse effects to biological systems even at very low concentrations. Among all heavy metals, copper is the most accumulated metal in wastewater, because it is commonly used in many industrial applications such as the production of electrical conductors, alloys, plant protection products and artificial fertilizers. Moreover, it can be accumulated in the water systems through the waste flows from the mines and metal processing plants [1]. The most efficient way to solve the problem of industrial wastewater is purification treatment, regardless of whether the purified water will be released into the natural recipes or re-used in technological processes.

Over the past decade, numerous methods have been investigated for removal of heavy metals from wastewater including adsorption, precipitation, ion exchange, membrane process, electrocoagulation and electrodeposition [2–4]. Adsorption method represents perspective approach in wastewater treatments from ecological point of view. So far, activated carbon is the most used adsorbent due to its high specific surface [5,6]. However, application of activated carbon is limited due to high cost of its production and regeneration process. Hence, significant efforts have been made to find new, cheaper and more efficient materials for this application. The most attention has been given to biobased materials, particularly to agro-industrial waste such as fruit peels that is easily accessible in large quantities [7–13]. The use of fruit peels as adsorbents can be beneficial from economic and ecological point of view, since these materials can be obtained at lower price, minimizing accumulation of agro-waste, providing possibility of regeneration of the adsorbent and the ability to extract metals from adsorbents. Citrus peels from various origins such as grapefruit, oranges and mandarins have been recently investigated in treatment of colored and heavy metal polluted wastewaters, due to wide abundance in the world [14–18]. Citrus peels are reach in lignin, cellulose and pectin that contain high amount of functional groups such as hydroxyl and carboxylic groups that are responsible groups for binding of divalent cations. On the other side, it was shown that fruit peels due to high content of lignocellulosic component don not have high surface area. In fact, the surface area for citrus peels is in range of 0.6–1.5 m^2/g [19]. Hence, in order to

The importance of the topics and the problems to be solved

DEFINE THE TOPIC AND/OR KEY TERMS USED IN THE PAPER

1. Introduction

Hydroxyapatite (HAP: $Ca_{10}(PO_4)_6(OH)_2$) has attracted much attention as a substitute material for damaged teeth or bones over the past several decades, because of its crystallographical and chemical similarity with various calcified tissues of vertebrates [1,2].

Hydroxyapatite is the main mineral constituent of teeth and bones. HAP ceramics does not exhibit any cytoxic effects. It shows excellent biocompatibility with hard tissues and also with skin and muscle tissues. Moreover, HAP can directly bond to the bone. Unfortunately, due to low reliability, especially in wet environments, the HAP cannot presently be used for heavy load-bearing applications, like artificial teeth or bones [1].

Multiple techniques have been used for preparation of HAP powders, as reviewed in several works [3]. Two main ways for preparation of HAP powders are wet methods and solid state reactions. In the case of HAP fabrication, the wet method can be divided into three groups: precipitation, hydrothermal technique, and hydrolysis of other calcium phosphates [3,4]. Depending upon the technique, materials with various morphology, stoichiometry, and level of crystallinity can be obtained. Solid state reactions usually give a stoichiometric and well-crystallized product, but they require relatively high temperatures and long heat treatment times. Moreover, sinterability of such powders is usually low. In the case of precipitation, where the temperature does not exceed 100 °C, nanometric-size crystals can be prepared. They have shapes of blades, needles, rods, or equiaxed particles. Their crystallinity and Ca/P ratio depend strongly upon the preparation conditions and are in many cases lower than those for well-crystallized stoichiometric hydroxyapatite. The hydrothermal technique usually gives HAP materials with a high degree of crystallinity and with a Ca/P close to the stoichiometric value. Their crystal size is in the range of nanometers to millimeters. Hydrolysis of tricalcium phosphate, monetite, brushite, or octacalcium phosphate requires low temperatures and results in HAP needles or blades having the size of microns. However, in most cases, the hydrolysis product is highly nonstoichiometric [1].

It is possible to improve the properties of HAP ceramic by controlling important parameters of powder precursors such as

STATE THE PURPOSE OF THE ARTICLE

cation to reduce sintering temperature [7]. Moreover, nanometer sized HAP is also expected to have better bioactivity than coarser crystals [8,9], nanophase ceramics clearly represent a unique and promising class of orthopedic/dental implant formulations with improved osseointegrative properties [9,10]. Recently, the use of precipitation processes for synthesis of HAP becomes an important research objective [11].

In this investigation, the precipitation method has been adapted to synthesize nanocrystalline HAP powder. Powder characterization including phase composition, morphology and distribution of grain size has been performed. In this method offers a molecular-level mixing of the calcium and phosphorus precursors, which is capable of improving chemical homogeneity and increasing phase transformation temperature to the other calcium phosphates phase of resulting HAP in comparison with conventional method.

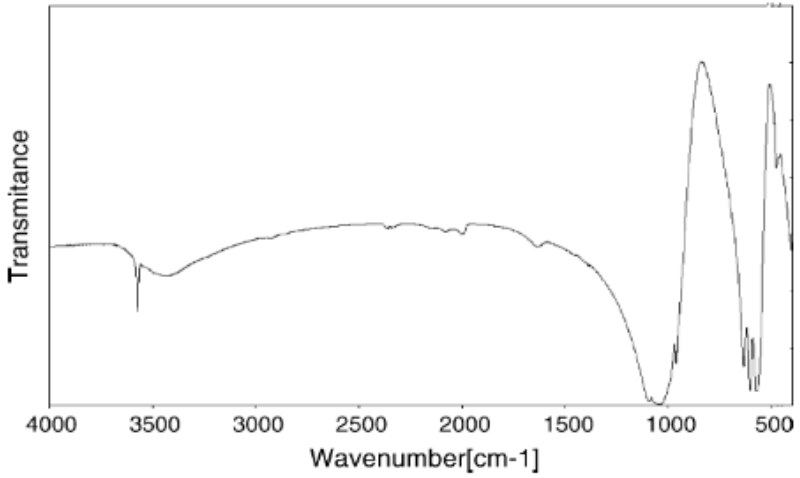


Fig. 1. FTIR spectroscopy analysis of the powder after drying at 80 °C.

Aims and Hypothesis

How can I assess the quality of my Introduction?

To make a self-assessment of your Introduction

You can ask yourself the following questions.

- Is my research question clear?
- Does my Introduction act as a clear road map for understanding my paper?
- Is it sufficiently different from the Abstract, without any cut and pastes? (some overlap is fine)
- Have I mentioned only what my readers specifically need to know and what I will subsequently refer to in the Discussion?
- Have I been as concise as possible?
- Have I used tenses correctly? present simple (general background context, description of what will be done in the paper), present perfect (past to present solutions), past simple (my contribution, though this may also be expressed using the present simple or future simple)

MATERIALS AND METHODS

Crucial in the **triage process**

- Extremely common for editors to reject a paper because authors used the **wrong method** to answer their question
- Give enough detail so that a qualified reader could **repeat the study**
- If your methods section is “thin on details” editors worry that you are **hiding something**

CONTENT OF METHODS

- Description of the site
- Description of the surveys or experiments done
- Description of the laboratory methods, start from the simplest to the more complex ones
- Description of the statistical methods used

METHODS

- Describe how the problem was studied
- Include detailed information to allow repetition
- Do not describe previously published procedures but cite clearly
- Identify the equipment and materials used
- Use proper notations including chemical formulae and symbols

Chemical Engineering Journal 168 (2011) 420–425

One-step synthesis of gold nanocatalysts on a microstructured paper matrix for the reduction of 4-nitrophenol

Hirotaka Koga*, Takuya Kitaoka

2.1. Materials

Ceramic fibers (SiO_2: 52 wt.%, Al_2O_3: 48 wt.%) and ZnO whiskers were purchased from IBIDEN, Ltd. and Matsushita Amtec, Ltd., respectively. Pulp fibers, being a matrix component in the paper fabrication process, were obtained by refining commercial bleached hardwood kraft pulp to a Canadian Standard Freeness of 300 mL with a Technical Association of the Pulp and Paper Industry standard beater. Two types of flocculants were used as retention aids, namely cationic poly(diallyldimethylammonium chloride) (PDADMAC; molecular weight ca. 3×10^5 g mol^{-1}; charge density 5.5 meq g^{-1}; Aldrich, Ltd.) and anionic polyacrylamide (A-PAM, HH-351; molecular weight ca. 4×10^6 g mol^{-1}; charge density 0.64 meq g^{-1}; Kurita, Ltd.). An alumina sol (Snowtex 520, Nissan Chemicals, Ltd.) was used as a binder to improve the physical strength of the paper composite following calcination.

2.4. Catalytic performance tests

The 4-NP reduction performance was investigated in batch mode. The aqueous solution of 4-NP (0.05 mM, 30 mL) was mixed with $NaBH_4$ (1.5 mmol) as a reducing agent only for 4-NP and then the Au/ZnO powder, AuNPs@ZnO whiskers or a piece of AuNPs@ZnO paper (8×10^2 mm^2) were added to the solution. In each case, the amount of Au catalyst was set at 5.0 μmol. The reaction was carried out at 25 °C with and without continuous stirring. At a given time, the reaction solution (1.0 mL) was sampled, and was filtered through a 0.2 μm membrane filter (Chromatodisk, GL Sciences, Ltd.). UV–vis spectra of the reaction solutions (1.0 mL) were recorded at room temperature using a U-3000 spectrophotometer (Hitachi, Japan). According to a previous report [7], the rate constants of the reduction process were determined by measuring the change in absorbance at 400 nm as a function of time.

METHODS: QUANTITATIVE STUDIES

- Design
- Sample
- Intervention
- Outcomes Measures
- Data Analysis
- Ethics: informed consent & IRB approval

DESIGN: STATE CLEARLY THE DESIGN USED

- Observational **or** interventional?
- Prospective **or** retrospective?
- Controlled **or** uncontrolled?
- If controlled, randomized **or** not?
- For randomized controlled studies, exactly **how** was the randomization done ?
- What was the **unit** of randomization?
- Was it a cohort study, cross-sectional survey **or** case-controlled study?

BIOLOGICAL SAMPLES: HOW DID YOU CHOOSE THEM?

- How did you determine your **sample size?** (include the power calculation)
- How did you recruit **participants?**
- How did you ensure that your sample was **representative** of the population you wanted to study?
- What measures did you use to **reduce bias** in the way you chose your sample?

INTERVENTION

- Describe the intervention you studied and what happened to the **control** group.
- What measures did you take to **blind** participants to which group they were in?
- Could **contamination** of the groups have occurred?

OUTCOME MEASURES

- Which **outcomes** did you decide to measure when you designed your study?
- Specify your **primary and secondary** outcomes.
- Did you use a **validated tool** to measure these?
- What steps did you use to reduce bias in the **recording** of outcomes?

DATA ANALYSIS

What statistical methods did you use to analyze your data?

ETHICAL PRINCIPLES: RESEARCH ON HUMANS AND ANIMALS

- For experiments involving human subjects, the committee approving the experiments should be identified and the research conducted according to the principles expressed
- The Authors should confirm that informed consent was obtained from all subjects.
- Appropriate approval, licensing or registration should be obtained before the research begins and details should be provided in the report (e.g. Institutional Review Board, Research Ethics Committee approval, national licensing authorities for the use of animals)
- Treatment must confirm to accepted international standards.
- Manuscript must document that the study was approved by an ethical review board before it was done.

ETHICAL CONSIDERATIONS

Informed consent
Institutional review board approval
IRB (The Institutional Review Board) approval from DEC countries needed as well

Ethical Clearance for Research. Research Integrity embodies a range of good research practice and conduct which can include intellectual honesty, accuracy, fairness, intellectual property, and protection of human and animal subjects involved in the conduct of research.

2. Materials and methods

2.1. Chemicals

Activated carbon from palm shells is made using H_3PO_4 as an activator. Chemical reagents were used such as H_3PO_4, $FeCl_3$, $FeCl_2$, NaOH from Merck, Germany. Procion Red MX-5B dye from Sigma Aldrich, CAS Number 17804-49-8. The songket's industrial wastewater from songket industry in Palembang, South Sumatra.

2.2. Preparation of activated carbon-Fe_3O_4 composite

Activated carbon was synthesized from palm shells which carbonized at 500 °C for 2 h. The carbonization result was milled to obtain size of 200 mesh (0.075 mm). A total of 100 g of palm shell powder was soaked with 300 mL of 5% H_3PO_4 solution, heated at 400 °C while flowed with N_2 at 150 cm^3 min^{-1} for 1 h. The product activated carbon was washed using 0.1 M NaOH solution, followed by distilled water until pH neutral. Activated carbon is dried at the oven at 110 °C for 2 h.

Activated carbon-Fe_3O_4 composite was obtained by using co-precipitation. $FeCl_2$ and $FeCl_3$ dissolved in the molar ratio of 1:2

$$q_e = (C_o - C_e)\frac{V}{W} \quad (2)$$

where q_e is adsorption capacity (mg g^{-1}), C_0 and C_e are initial concentration of dye and equilibrium liquid phase concentration (mg L^{-1}), V is volume of solution (L), and W is weight of composite (g). The similar treatment for songket's industrial wastewater using activated carbon-Fe_3O_4 composite was also conducted to reduce concentration of Procion Red MX-5B and COD. Analysis of COD followed the Standard Test Methods (ASTM D1252-06) for COD [22].

2.4. Toxicity test

The experiment was conducted in 25 L glass aquaria consisting of songket's industrial wastewater with concentrations of 0, 2, 4, 6, 8, 10%, and composite treated songket's industrial wastewater. The Tilapia fish were found from the local fishery and acclimated for ten days in the laboratory. Each aquarium filled with 20 Tilapia fish with approximately equal weight and length. Distilled water is used as dilution and control conditions of experiment include pH, temperature, and total hardness according to APHA [23]. Constant air flowed into the glass aquaria using a pump.

The material used must be clear (quality, source etc)

2.2. Characterization of the powder

The morphology of powders obtained under the mentioned conditions was studied by a field effect scanning electron microscope (JEOL-JSM-6700F) equipped with an EDAX PV 9760 detector for energy dispersive microanalysis (EDX) to analyse local chemical composition.

The detailed morphology and microstructure were examined by a JEOL-JEM 210 FEG transmission electron microscope (TEM) equipped with a slow digital camera scan, using an accelerating voltage of 200 kV. High resolution transmission electron microscopy (HRTEM) images were obtained in thin crystals.

The crystalline structure and the phase composition of the resulting powder were determined using a Siemens D-5000 X-ray diffractometer. Data were collected over the 2θ range 5° to 40°. Identification of phases was achieved by comparing the diffraction patterns of HA with ICDD (JCPDS) standards.

In order to obtain an estimation of the β-TCP content in our powder samples, bi-component mixtures of HA and β-TCP (Plasma-Biotal, UK) with different weight proportions were analysed by XRD according to the method established by standard ISO-13779:3. Integrated intensity ratios of peak 211 of HA and peak 0210 of β-TCP were used for plotting the calibration curve weight/peak integrated intensity ratio [16].

The instrument used must be mentioned

2.3. Cell culture

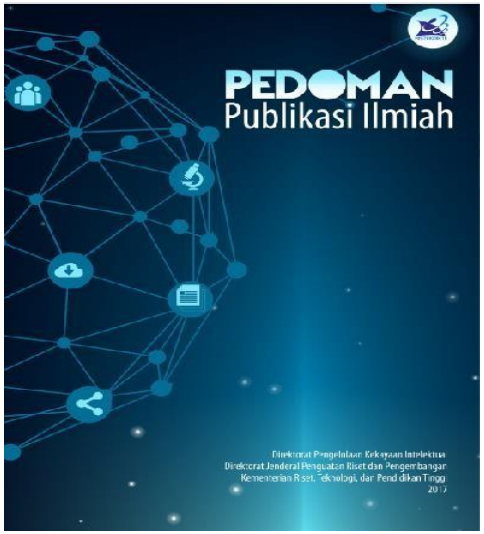
Mouse calvaria MC3T3-E1 cells from passage 6 were obtained from the European Collection of Cell Cultures (Salisbury, UK). The cells were cultured in alpha minimum essential medium (α-MEM) with nucleotides and glutamine (Lonza) supplemented with 10% of foetal bovine serum (Lonza) without antibiotics, and maintained at 37 °C in a humidified atmosphere with 5% of CO_2.

The use of bacteria or microorganisms must be clear in type and source

Some common pitfalls in writing Materials and Methods

- Method sections are often overly brief and lacking in detail
- Treating the method as a chronological history of what happened

REFERENSI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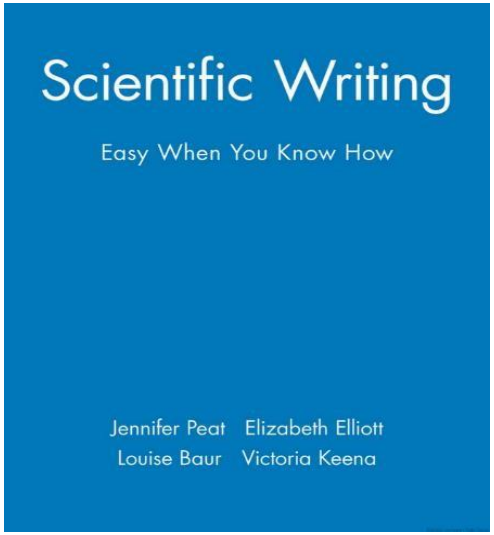
Scientific Writing
Easy When You Know How
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Louise Baur Victoria Keena


Terima
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