LEMBAR HASIL PENILAIAN SEJAWAT SEBIDANG ATAU PEER REVIEW KARYA ILMIAH : PROSIDING

Judul Karya Ilmiah (Prosiding)	:	Heat using	ing value prediction for comb g backpropagation neural netw	ousti vorl	ible fraction of municipal solid waste in Semarang k
Nama/ Jumlah Penulis Status Pengusul	:	4 Orang Penulis pertama/ Penulis ko-3 /-Penulis Korespondesi, **			
Identitas Prosiding	:	a.	Judul Prosiding	:	International Conference Of Chemical And Material Engineering (ICCME) 2015: Green Technology for Sustainable Chemical Products and Processes
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			Alamat Artikel	:	https://pubs.aip.org/aip/acp/article- pdf/doi/10.1063/1.4938313/12864247/030028_1_ online.pdf
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Hasil Penilaian *Peer Review* :

Vannanan	Nilai Maks		
Yang Dinilai	Reviewer 1	Reviewer 2	Rata-rata
a. Kelengkapan unsur isi prosiding (10%)	3	3	3
b. Ruang lingkup dan kedalaman pembahasan (30%)	8,8	8,9	8,85
 Kecukupan dan kemutahiran data/informasi dan metodologi (30%) 	8,9	8,9	8,9
d. Kelengkapan unsur dan kualitas terbitan /prosiding (30%)	9	9	9
Total = (100%)	29,7	29,8	29,75

Reviewer 1

Prof. Dr. Kusworo Adi, S.Si., M.T. NIP. 197203171998021001 Unit Kerja : Fakultas Sains dan Matematika Bidang Ilmu: Fisika

Semarang, 10 Mei 2023 Reviewer 2

Prof. Dr. Heri Sutanto, S.Si., M.Si. NIP. 197502151998021001 Unit Kerja : Fakultas Sains dan Matematika Bidang Ilmu: Fisika

LEMBAR HASIL PENILAIAN SEJAWAT SEBIDANG ATAU PEER REVIEW KARYA ILMIAH : PROSIDING

Judul Karya Ilmiah (Prosiding)	:	Heating value prediction for con using backpropagation neural ne	ıbusti tworl	ible fraction of municipal solid waste in Semarang k	
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Identitas Prosiding		a. Judul Prosiding	:	International Conference Of Chemical And Material Engineering (ICCME) 2015: Green Technology for Sustainable Chemical Products and Processes	
		b. ISBN/ISSN	:	1742-6588, eISSN : 1742-6596	
		c. Thn Terbit, Tempat Pelaks	:	AIP Conference Proceedings 1699, 030028 (2015)	
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		e. Alamat Repository/Web	:	https://pubs.aip.org/aip/acp/article/1699/1/030028 /884064/Heating-value-prediction-for- combustible-fraction	
		Alamat Artikel	:	https://pubs.aip.org/aip/acp/article- pdf/doi/10.1063/1.4938313/12864247/030028_1_ online.pdf	
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	Nilai Mak	Nilai Akhir	
Komponen Yang Dinilai	Internasional	Nasional	Yang Diperoleh
a. Kelengkapan unsur isi prosiding (10%)	3		3
b. Ruang lingkup dan kedalaman pembahasan (30%)	9		8,8
c. Kecukupan dan kemutahiran data/informasi dan metodologi (30%)	9		8,9
d. Kelengkapan unsur dan kualitas terbitan /prosiding (30%)	9		9
Total = (100%)	30		29,7
Nilai Pengusul = 60% x 29.7 = 17.82			

Catatan Penilaian Paper oleh Reviewer :

1. Kesesuaian dan kelengkapan unsur isi prosiding:

Artikel telah ditulis seuai dengan format AIP Conference Proceedings . Latar belakang sangat singkat dan kebaruan dikemukakan secara explisit. Unsur-unsur artikel lengkap.

2. Ruang lingkup dan kedalaman pembahasan:

Substansi artikel sesuai dengan ruang lingkup prosiding pada Seminar on New Paradigm and Innovation on Natural Science and Its Applications (ISNPINSA). Pengembangan metode untuk pemodelan nilai kalor menggunakan jaringan syaraf tiruan..

3. Kecukupan dan kemutakhiran data/informasi dan metodologi:

Data-data hasil penelitian adalah data dengan metode yang baru, sudah menunjukkan ada kebaruan informasi. Terdapat kesesuain pustaka dengan tema penelitian dan sumber pustaka rata-rata relative baru, sehingga aspek keterbaruannya cukup baik

4. Kelengkapan unsur dan kualitas terbitan/ prosiding:

Kualitas penerbitan cukup baik.. Paper berasal dari konferensi dimuat di AIP Conference Proceedings, terindeks Scopus, Q4. Nilai maximum 30.

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LEMBAR HASIL PENILAIAN SEJAWAT SEBIDANG ATAU PEER REVIEW KARYA ILMIAH : PROSIDING

Judul Karya Ilmiah (Prosiding)	:	Heat usin	ting value prediction for coml g backpropagation neural net	ousti worl	ible fraction of municipal solid waste in Semarang k		
Nama/ Jumlah Penulis	:	4 Or	4 Orang				
Status Pengusul	:	Penu	Penulis pertama/ Penulis ke 3 /-Penulis Korespondesi **				
Identitas Prosiding	:	a.	Judul Prosiding	:	International Conference Of Chemical And Material Engineering (ICCME) 2015: Green Technology for Sustainable Chemical Products and Processes		
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Kategori Publikasi Makalah		:	\checkmark <i>Prosiding</i> Forum Ilmia	ah Ir	nternasional		
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	Nilai Mak	Nilai Akhir			
Komponen Yang Dinilai	Internasional	Nasional	Yang Diperoleh		
a. Kelengkapan unsur isi prosiding (10%)	3		3		
 Ruang lingkup dan kedalaman pembahasan (30%) 	9		8,9		
 Kecukupan dan kemutahiran data/informasi dan metodologi (30%) 	9		8,9		
 Kelengkapan unsur dan kualitas terbitan /prosiding (30%) 	9		9		
Total = (100%)	30		29,8		
Nilai Pengusul = 60%x29,3=17,58					

Catatan Penilaian Paper oleh Reviewer :

1. <u>Kesesuaian dan kelengkapan unsur isi prosiding:</u> Artikel telah ditulis lengkap dari abstrak hingga referensi seuai dengan format penulisan AIP Conference Proceedings. Latar belakang sangat singkat dan kebaruan dikemukakan secara explisit. Topik artikel sesuai scope prosiding.

2. Ruang lingkup dan kedalaman pembahasan:

Substansi artikel sesuai dengan ruang lingkup jurnal pada Seminar on new Paradigm and Innovation on Natural Science and Its Applications . Pembahasan sudah diungkapkan dengan baik dan jelas. Pengembangan metode untuk pemodelan nilai kalor dengan menggunakan jaringan syaraf tiruan

3. <u>Kecukupan dan kemutakhiran data/informasi dan metodologi:</u> Data-data hasil penelitian adalah data dengan metode yang haru

Data-data hasil penelitian adalah data dengan metode yang baru, sudah menunjukkan ada kebaruan informasi. Terdapat kesesuain pustaka dengan tema penelitian dan sumber pustaka rata-rata relative baru, sehingga aspek keterbaruannya cukup baik

4. <u>Kelengkapan unsur dan kualitas terbitan/ prosiding:</u> Kualitas penerbitan cukup baik. Paper berasal dari konferensi dimuat di AIP Conference Proceedings, terindeks Scopus, Q4. Nilai maximum 30.

> Semarang, 5 Mei 2023 Reviewer/2

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Heating value prediction for combustible fraction of municipal solid waste in Semarang using backpropagation neural network

Khuriati, Ainie^{a, b} 🖾 ; Setiabudi, Wahyu^{a, b}; Nur, Muhammad^{a, b}; Istadi, Istadi^{a, c}

^a Doctorate Program of Environmental Science, Diponegoro University, Semarang, 50241, Indonesia ^b Department of Physics, Diponegoro University, Semarang, 50275, Indonesia ^c Department of Chemical Engineering, Diponegoro University, Semarang, 50275, Indonesia



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Backpropgation neural network was trained to predict of combustible fraction heating value of MSW from the physical composition. Waste-to-Energy (WtE) is a viable option for municipal

solid waste (MSW) management. The influence of the heating value of municipal solid waste (MSW) is very important on the implementation of WtE systems. As MSW is heterogeneous material, direct heating value measurements are often not feasible. In this study an empirical model was developed to describe the heating value of the combustible fraction of municipal solid waste as a function of its physical composition of MSW using backpropagation neural network. Sampling process was carried out at Jatibarang landfill. The weight of each sorting sample taken from each discharged MSW vehicle load is 100?kg. The MSW physical components were grouped into paper wastes, absorbent hygiene product waste, styrofoam waste, HD plastic waste, plastic waste, rubber waste, textile waste, wood waste, yard wastes, kitchen waste, coco waste, and miscellaneous combustible waste. Network was trained by 24 datasets with 1200, 769, and 210 epochs. The results of this analysis showed that the correlation from the physical composition is better than multiple regression method. © 2015 AIP Publishing LLC.

Author keywords

Abstract

backpropagation neural network; heating value; MSW; physical composition; stepwise multiple regression



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Preface: International Conference on Chemical and Material Engineering (ICCME) 2015 September 29-30, 2015

We are very pleased to introduce the proceedings of The 2nd International Conference on Chemical and Material Engineering (ICCME) 2015. The conference has been conducted by Chemical Engineering Department, Diponegoro University in Semarang on 29-30 September 2015, in conjunction with The Golden Jubilee (50th) of the Department of Chemical Engineering, Diponegoro University. The 200 scientific participants have participated in the conference, and had many fruitful discussions and exchanges that contributed to the success of the conference. Participants from six countries made the conference truly international in scope.

In this conference, it had been presented 125 abstracts which were selected from 175 registered abstracts and these presentations formed the heart of the conference and provided ample opportunity for discussion in the scope of green technology for sustainable chemical products and processes. The abstracts were split almost equally between the four main conference areas, i.e., Food and Bioprocess Engineering (FBE), Material and Science Development (MSD), Process and System Engineering (PSE) and Separation and Purification Engineering (SPE). Prior to the abstract presentations, there were four plenary speakers had been presented: Prof. Choi Kwang-Hwan from Pukyong National University (PKNU) Korea, Prof. Dr. Shin-Ichiro Kawasaki from National Institute of Advanced Industrial Science and Technology (AIST) Japan, Prof. Sugeng Triwahyono from University Technology Malaysia, Prof. Heru Susanto from Diponegoro University. These speakers gave high valuable impact to the conference and brought new research idea to the participants.

This proceeding consists of 96 full-text papers which have been selected from the presented abstract. The selection was conducted and reviewed by scientific committee. We kindly express our acknowledge to Prof. Hadi Nur (Ibnu Sina Institute Malaysia), Prof. Arief Budiman (UGM Indonesia) Dr Ferry Iskandar (ITB Bandung), Dr Hadiyanto (Diponegoro University), Dr Suryadi Ismadji (Widya Mandala University, Surabaya) who gave valuable review and comments on the papers.

Finally, it is appropriate that we record our thanks to Advisory Board of conference, our fellow members of the Organizing Committee and supporting funds from Institute of Research and Community Services, Diponegoro University. We are also indebted to those who served as chairmen/women during the parallel sessions. Without their support, the conference could not have been the success that it was. We also acknowledge the authors themselves, without whose expert input there would have been no successful conference. The continuing success of this conference series means that planning can now proceed with confidence for the next event.

Hadiyanto, Hadi Nur, Arief Budiman, Ferry Iskandar, Suryadi Ismadji Editor

International Conference on Chemical and Material Engineering (ICCME) 2015 September 29-30, 2015

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Biogas production from rice straw by solid-state anaerobic digestion

Lukhi Mulia Shitophyta; Budiyono; Ahmad M. Fuadi

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Characteristics of ZnO nanostructures syr	nthesized by s	sonochemical r	eaction: E	Effects of o	continuous a	and
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Abstract ∨	View article	🖾 PDF
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Combination of natural fiber *Boehmeria nivea* (ramie) with matrix epoxide for bullet proof vest body armor

Didi Dwi Anggoro; Nunung Kristiana

AIP Conference Proceedings 1699, 040002 (2015) doi: https://doi.org/10.1063/1.4938317

Abstract → View article DF

Biosurfactant production by *Pseudomonas fluorescens* growing on molasses and its application in phenol degradation

Venty Suryanti; Soerya Dewi Marliyana; Astri Wulandari

AIP Conference Proceedings 1699, 040003 (2015) doi: https://doi.org/10.1063/1.4938318



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Practical development of continuous supercritical fluid process using high pressure and high temperature micromixer

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Abstract. In the synthesis of metal oxide fine particles by continuous supercritical hydrothermal method, the particle characteristics are greatly affected by not only the reaction conditions (temperature, pressure, residence time, concentration, etc.), but also the heating rate from ambient to reaction temperature. Therefore, the heating method by direct mixing of starting solution at room temperature with supercritical water is a key technology for the particle production having smaller size and narrow distribution. In this paper, mixing engineering study through comparison between conventional T-shaped mixers and recently developed swirl mixers was carried out in the hydrothermal synthesis of NiO nanoparticles from Ni(NO₂)₂ aqueous solution at 400 °C and 30 MPa. Inner diameter in the mixers and total flow rates were varied. Furthermore, the heating rate was calculated by computational fluid dynamics (CFD) simulation. Relationship between the heating rate and the average particle size were discussed. It was clarified that the miniaturization of mixer inner diameter and the use of the swirl flow were effective for improving mixing performance and contributed to produce small and narrow distribution particle under same experimental condition of flow rate, temperature, pressure, residence time, and concentration of the starting materials. We have focused the mixer optimization due to a difference in fluid viscosity.

INTRODUCTION

Metal oxide nanoparticles have been widely developed for the innovative materials such as medical technology [1, 2], reaction catalyst [3, 4], and electronics field [5, 6]. Metal oxide nanoparticles having small size and narrow distribution have been required. Several synthesis methods such as sol-gel [7], spray pyrolysis [8], thermal decomposition [9] and hydrothermal / solvothermal synthesis [10] have been applied for producing the metal oxide nanoparticles. However, these methods require extremely high temperature, long reaction time, concentrated base solution, surfactants and organic solvents for preparing the nanoparticles. Furthermore, additional processes such as calcination and comminution are necessary in some cases.

Continuous supercritical hydrothermal method has been developed as an environmentally friendly synthesis for the functional metal oxide particles production because water is basically used for reaction medium [11-20]. In this method, aqueous solutions of metal salts are rapidly heated to the supercritical state (e.g., 400 °C and 30 MPa) by mixing with high temperature supercritical water (SC-H₂O) in a T-shaped mixer using a flow-through reaction system [11]. At supercritical condition, reaction rate of hydrothermal synthesis drastically increases and metal oxide solubility sharply decreases because of decreasing water density and dielectric constant of water [12]. This method promises the formation of highly crystalline and smaller metal oxide particles compared with conventional batch methods of hydrothermal synthesis. However, this method still has some problems such as the particle formation of

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wide size distribution or multi-peak distribution. In typical experiments, total flow rate and inner diameter in the Tshaped mixer are in the range from 10 to 20 mL/min and from 2.3 to 1.3 mm, respectively [11, 12, 14, 17-19]. Reynolds number at typical experimental conditions of 400 °C and 30 MPa are in the range from 2,000 to 7,000. Therefore, the main reason of the above-mentioned problems is considered to be insufficient low fluid mixing performance (i.e. low heating rate to reaction temperature) due to the low Reynolds number flow in the mixer. This low fluid mixing performance causes in the gradual heating of the starting solution through subcritical condition of low hydrothermal reaction rate, high solubility and low degree of supersaturation and the formation of larger particles due to the progress of secondary nucleation and growth after primary nucleation during the heating period. One method for improving the mixing rate is development of the mixers having new structures. Actually, some types of mixers such as Y-shape [21], nozzle type [22], and central collision type [23] were reported. These mixers results in the formation of nanoparticles having relatively narrow size distributions. Recently, we developed a new type mixer using swirl flow (swirl mixer, maximum inner diameter ID = 3.2 mm) and showed an advantage for producing small-size nanoparticles with narrow size distribution [24]. Another method is miniaturization of the mixer inner diameter. The miniaturization has been widely known as a simple and effective technique for improving the mixing rate. We have been studied the miniaturization effect of T-shaped mixers [25]. In addition, very recently, novel micro swirl mixer (ID = 0.8, 0.5 mm) for further increasing of heating rate were developed to produce nanoparticles having a smaller and more uniform size by miniaturization of swirl mixer (ID = 3.2 mm) [26].

In this work, effect of the miniaturization and the use of swirl mixers (ID = 3.2, 0.8, and 0.5 mm) on the particle size and distribution in the continuous supercritical hydrothermal method were carefully studied over a wide range of the total flow rates from 12 to 89 g/min and Reynolds numbers from 3,000 to 100,000 at 400 °C and 30 MPa. Computational fluid dynamics (CFD) simulation was carried out for understanding of heating performance and determination of the heating rate of the starting solution to reaction temperature. Then, NiO synthesis was carried out by the continuous supercritical hydrothermal method for discussing the relationship between the mixer configuration and the characteristics of the obtained nanoparticles.

Effects of Water Blanching On Polyphenol Reaction Kinetics and Quality of Cocoa Beans

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Abstract. Several studies have been reported on the potential health benefits of cocoa polyphenols. However, drying has an inhibitory effect on the substantial recovery of cocoa polyphenols. This is majorly because of the high degradation of polyphenol compounds as well as the enhanced activity of polyphenol oxidases; a pre-cursor for browning of polyphenols during drying. Pre-treatment technique such as water blanching (80° and 90° C for 5 min, 10 min and 15 min exposure times respectively) can inactivate the polyphenol oxidases enzyme and promote high percent of the polyphenol recovery in dried cocoa bean. The degradation after blanching was found to be ranging from 0.0208 to 0.0340 /min. The results for dried fresh cocoa beans showed an optimal level of polyphenol recovery (118 mg GAE/g) when blanched at 90°C for 5 minutes duration. The antioxidant activity is also analyzed using DPPH scavenging assay.

Keywords: COCOA, POLYPHENOL, DRYING, WATER BLANCHING, QUALITY

INTRODUCTION

Cocoa is an important commodity which finds in application in food, pharmaceutical and cosmetic industries. There has been varied research going on the medical benefits of cocoa polyphenols. The polyphenol content in cocoa is found to be more than red wine and green tea [1]. The health benefits of cocoa polyphenols ranges from anti-atherosclerotic, anticariogenic, anticarcinogenic, antidepressant, antihypertensive, antiinflammatory, antimutagenic, antiproliferative and antiradical properties to cardioprotective effects [2]. Three distinguished groups of polyphenols present in cocoa beans namely proanthocyanidins (58%), catechins (37%) and anthocyanins (4%) [3]. Typically, the cocoa polyphenols contents are about 6 to 8% by weight of a dried fermented cocoa bean. The

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Hydrophilic Polymer Composites Synthesized by Electrospinning under Dense Carbon Dioxide

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Abstract. Electrospinning technique is feasible in some applications, it has attracted more attention in recent years. Various polymers have been successfully electrospun into ultrafine fibers in solvent solution and some in melt form. In this work, polyvinylpyrrolidone (PVP) as a hydrophilic polymer would be synthesized by electrospinning under dense carbon dioxide (CO₂). The experiments were performed at 40 °C and ~ 5 MPa. During the electrospinning process, the applied voltage was 10–17 kV and the distance of nozzle and collector was 8 cm. The concentration of PVP solution as a major component was 4 wt%. The results showed that the fibers surface morphology from PVP which blended with poly L-lactide acid (PLLA) were smooth with hollow core fibers at 5 MPa. At the same conditions, PVP-carbon nanotube was also successfully generated into electrospun fiber products with diameter ~ 2 μ m.

Keywords: Electrospinning, Polyvinylpyrrolidone (PVP), Hollow fibers; Dense CO₂, Polymer blends

INTRODUCTION

Polyvinylpyrrolidone (PVP) is a water-soluble polymer made from the monomer N-vinylpyrrolidone. Due to PVP has hydrophilic as well as hydrophobic functional groups, this polymer could soluble in various organic solvents. PVP was a nonionic water-soluble polymer and its viscosity in aqueous solution is not affected by electrolytes. Therefore, it allows to use this polymer in a variety of fields-of-use owing to following its advantageous characteristics. PVP is an environmental friendly synthetic polymer, biocompatibility, and widely used in biomedical, biochemical, food, textile, and other fields [1]. Similar to PVP, poly L-lactide acid (PLLA), polymer derived from lactic acid, is also biocompatible and environmental degradable and has wide applications [2]. This polymer was composed and derived from renewable resources mainly starch and sugar, so that PLLA seemed to be a promising material to reduce the environmental solid waste disposal problem. The most interesting aspect of PLLA is its biocompatibility with respect to biomedical applications that results non-toxic or non-carcinogenic effects in local tissues. However, PLLA is a hydrophobic polymer causing to the certain limitation of its applications. Generally, PLLA was modified with PVP in organic solvents to hinder its hydrophobicity property.

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Selective Transport of Fe(III) using Ionic Imprinted Polymer (IIP) Membrane Particle

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Abstract. The membrane particles was prepared from polyvinyl alcohol (PVA) and polymer IIP with weight ratios of 1: 2 and 1: 1 using different adsorbent templates and casting thickness. The permeability of membrane towards Fe(III) and also mecanism of transport were studied. The selectivity of the membrane for Fe(III) was studied by performing adsorption experiments also with Cr(III) separately. In this study, the preparation of Ionic Imprinted Polymer (IIP) membrane particles for selective transport of Fe (III) had been done using polyeugenol as functional polymer. Polyeugenol was then imprinted with Fe (III) and then crosslinked with PEGDE under alkaline condition to produce polyeugenol-Fe-PEGDE polymer aggregates. The agrregates was then crushed and sieved using mesh size of 80 and the powder was then used to prepare the membrane particles by mixing it with PVA (Mr 125,000) solution in 1-Methyl-2-pyrrolidone (NMP) solvent. The membrane was obtained after casting at a speed of 25 m/s and soaking in NaOH solution overnight. The membrane sheet was then cut and Fe(III) was removed by acid to produce IIP membrane particles. Analysis of the membrane and its constituent was done by XRD, SEM and size selectivity test. Experimental results showed the transport of Fe(III) was faster with the decrease of membrane thickness, while the higher concentration of template ion correlates with higher Fe(III) being transported. However, the transport of Fe(III) was slower for higher concentration of PVA in the membrane. IImparticles works through retarded permeation mechanism, where Fe(III) was bind to the active side of IIP. The active side of IIP membrane was dominated by the -OH groups. The selectivity of all IIP membranes was confirmed as they were all unable to transport Cr (III), while NIP (Non-imprinted Polymer) membrane was able transport Cr (III).

Keywords:IIP Membrane particle, polyeugenol, functional polymer, selective transport of Fe.

INTRODUCTION

In the last decade, imprinting techniques is used for the buildup of molecularly imprinted membranes (MIMs) that can selectively recognize target molecule in a solution during a simple static adsorption as well as permeation through a membrane device [1].

The transport of metal ions had been studied as a form of separation, saturation and recovery for both precious and toxic metals. This study was driven by the environmental concerns and the decrease of natural resources. With site-specific receptors incorporated into imprinted membrane, the membrane will then have specific transport or penetration routes, pores or matrices through only the desired ions will be able to pass [2].

MIMs are membranes that can either IIPs contain IIPS. There are three main strategies that can be used to synthesize MIM [3-4]: (1) sequential approach preparation of membrane from IIP_s that had been prepared using conventional method; (2) simultaneous formation of IIP structure and membrane morphology; and (3) Sequential

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