

# Introduction

This International conference is for promoting collaborative research program on physical and chemical studies of functional materials under the collaboration between Indonesian researchers of 14 universities in Indonesia and some researchers from 10 institutions/universities in Asia and Europe. This second activity is based on the Memorandum of Understanding (MoU) between 4 Indonesian universities (Bandung Institute of Technology (ITB), Padjadjaran University (UNPAD), Sepuluh Nopember Institute of Technology (ITS) and Gadjah Mada University (UGM)) and RIKEN-Nishina Center. Through this conference, we will continuing to create the mutually collaborative research such as:

1. Development of collaborative research projects involving the use of the research facilities in Indonesia and other countries that can support and increase the quality of research in Indonesia.
2. Developing a research cluster focusing on the functional materials science.
3. Increasing the number of researchers and graduate students exchange from more universities in Indonesia.
4. Enhancing joint supervision of Indonesian graduate students which is related to the research cluster theme.

In 2011, we arranged an event for gathering between Indonesian and researcher from other countries that organized by 3 Indonesia universities (ITB, UNPAD, ITS) and RIKEN (International Conference on Functional Materials Science 2011 held in Bali, April 27-28, 2011). For continuing in developing and promoting these research collaborations, we created second international conference with the title:

## **2<sup>nd</sup> International Conference on Functional Materials Science 2014**

“The Development of Advanced Research on Materials Science in Indonesia”

# Scope

The research scopes in **2<sup>nd</sup> International Conference on Functional Materials Science 2014** listed below:

1. Advanced and Functional Materials
2. Energy conversion materials and devices
3. New Materials for Energy
4. Biomaterials
5. Theoretical/Modeling/Computer Simulations of Functional Materials
6. Spectroscopy for Advanced Materials
7. Hybrid and Composite Materials
8. Magnetic Materials

# Invited Speakers

1. Isao Watanabe (RIKEN)
2. Yoji Koike (Tohoku University, Japan)
3. Yukio Furukawa (Waseda University, Japan)
4. Yasuo Nozue (Osaka University, Japan)
5. Tadashi Adachi (Sophia University, Japan)
6. Yoh Kohori (Chiba University, Japan)
7. Andriwo Rusydi (National University of Singapore, Singapore)
8. Hiromi Taniguchi (Saitama University, Japan)
9. Shukri Sulaiman (Universiti Sains Malaysia, Malaysia)
10. Ariando (National University of Singapore, Singapore)
11. Rahmat Hidayat (Bandung Institute of Technology)
12. Noriyuki Kuwano (Kyushu University)

# Organizing Committee

**Chair** : Risdiana (UNPAD)  
**Co-chair** : Yusril Yusuf (UGM)  
**Secretary** : Lusi Safriani (UNPAD)  
Harini Sosiati (UGM)

Darminto (ITS)

Kuwat Triyana (UGM)

Agung A. Nugroho (ITB)

Harsojo (UGM)

Triwikantoro (ITS)

Ayi Bahtiar (UNPAD)

Irwan A. Dharmawan (UNPAD)

Suminar Pratapa (ITS)

Mochamad Zainuri (ITS)

Budhy Kurniawan (UI)

Fitrilawati (UNPAD)

Kasnawi Al Hadi (Universitas Mataram)

Teguh Ardianto (Universitas Mataram)

Laili Mardiana (Universitas Mataram)

Lily Maysari Anggraeni (Universitas Mataram)

Alfina Yuridis Alaydrus (Universitas Mataram)

Siti Alaa (Universitas Mataram)

Nurul Qomariyah (Universitas Mataram)

# Program

<b>11 November 2014</b>				
15.00 – 18.00	Registration			
<b>1<sup>st</sup> day – 12 November 2014</b>				
<b>Time</b>	<b>Agenda</b>			
07.00 – 07.55	Registration			
<b>Time</b>	<b>Room A</b>	<b>Room B</b>	<b>Room C</b>	<b>Room D</b>
07.55 – 08.00	Welcoming address	Welcoming address	Welcoming address	Welcoming address
08.00 - 08.15	FMM-A-1	FMM-B-1	FMM-C-1	FMM-D-1
08.15 - 08.30	FMM-A-2	FMM-B-2	FMM-C-2	FMM-D-2
08.30 - 08.45	FMM-A-3	FMM-B-3	FMM-C-3	FMM-D-3
08.45 - 09.00	FMM-A-4	FMM-B-4	FMM-C-4	FMM-D-4
09.00 – 09.10	Coffee Break			
09.10 – 09.20	Opening Ceremony of ICFMS 2014			
09.20 – 10.00	<b>Invited Speaker I (I. Watanabe)</b>			
10.00 – 10.40	<b>Invited Speaker II (Y. Koike)</b>			
10.40 – 11.20	<b>Invited Speaker III (Y. Furukawa)</b>			
11.20 – 13.00	Photo ICFMS 2014 Lunch Break			
<b>Time</b>	<b>Room A</b>	<b>Room B</b>	<b>Room C</b>	<b>Room D</b>
13.00 -13.30	<b>Invited Speaker IV (Ariando)</b>	<b>Invited Speaker V (Y. Nozue)</b>	<b>Invited Speaker VI (S. Sulaiman)</b>	<b>Invited Speaker VII (H. Taniguchi)</b>
13.30 -14.00	<b>Invited Speaker VIII (Y. Kohori)</b>	FMN-B-1	<b>Invited Speaker IX (Rahmat H.)</b>	<b>Invited Speaker X (N. Kuwano)</b>
		FMN-B-2		
14.00 -14.15	FMN-A-1	FMN-B-3	FMN-C-1	FMN-D-1
14.15 -14.30	FMN-A-2	FMN-B-4	FMN-C-2	FMN-D-2
14.30 -14.45	FMN-A-3	FMN-B-5	FMN-C-3	FMN-D-3
14.45 -15.00	FMN-A-4	FMN-B-6	FMN-C-4	FMN-D-4

15.00 – 16.30	<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>	<b>I</b>	<b>J</b>	<b>K</b>
	FMN-E-1	FMN-F-1	FMN-G-1	FMN-H-1	FMN-I-1	FMN-J-1	FMN-K-1
	FMN-E-2	FMN-F-2	FMN-G-2	FMN-H-2	FMN-I-2	FMN-J-2	FMN-K-2
	FMN-E-3	FMN-F-3	FMN-G-3	FMN-H-3	FMN-I-3	FMN-J-3	FMN-K-3
	FMN-E-4	FMN-F-4	FMN-G-4	FMN-H-4	FMN-I-4	FMN-J-4	FMN-K-4
	FMN-E-5	FMN-F-5	FMN-G-5	FMN-H-5	FMN-I-5	FMN-J-5	FMN-K-5
	FMN-E-6	FMN-F-6	FMN-G-6	FMN-H-6	FMN-I-6	FMN-J-6	FMN-K-6
	FMN-E-7	FMN-F-7	FMN-G-7	FMN-H-7	FMN-I-7	FMN-J-7	FMN-K-7
	FMN-E-8	FMN-F-8	FMN-G-8	FMN-H-8	FMN-I-8	FMN-J-8	FMN-K-8
	FMN-E-9	FMN-F-9	FMN-G-9	FMN-H-9	FMN-I-9	FMN-J-9	FMN-K-9
	FMN-E-10	FMN-F-10	FMN-G-10	FMN-H-10	FMN-I-10	FMN-J-10	FMN-K-10
16.30 – 17.10	<b>Invited Speaker XI (T. Adachi)</b>						
17.10 – 17.50	<b>Invited Speaker XII (A. Rusydi)</b>						
17.50 – 18.00	Closing						
19.00 – 21.00	Dinner						
<b>2<sup>nd</sup> day – 13 November 2014</b>							
08.00 - 08.15	Summary of ICFMS 2014 for Magnetic Materials (Y. Koike)						
08.15 - 08.30	Summary of ICFMS 2014 for Functional Materials (Y. Furukawa)						
08.30 - 08.45	Summary of ICFMS 2014 for Computation Materials (S. Sulaiman)						
08.45 - 09.00	Summary of ICFMS 2014 for Research Collaboration (I. Watanabe)						
09.00 - 09.15	Summary of ICFMS 2014 for Next ICFMS 2016 (Darminto)						
09.15 - 09.30	Closing Ceremony						
09.30 - 17.00	Lombok Field Trip (Optional)						

# List of Contributed Speakers

No.	Name	Title	Code
1	Anne Zulfia, Salahuddin J and Ahmad Hafeizh E	Characterization of Al-Si-Mg/Al <sub>2</sub> O <sub>3</sub> Nano Composite Produced by Stir Casting Method	FMM-A-1
2	Aris Doyan and Susilawati	Dielectric and Conductivity Properties of Polyacrilamide Gels Material	FMM-A-2
3	Norman Syakir, Annisa Aprillia, Fitrilawati and Sagung Oka Aditia	Tunning the Emission Color Coordinate of Comersial White-Light LED Use the Poly- TMSPMA Doped Dye DCM	FMM-A-3
4	R. Tasomara, T. Kawamata, Y. Matsuoka, H.Sudo, K. Naruse, M. Ohno, H. Nagasawa, Y. Hagiya, T. Sasaki, Risidiana and Y. Koike	Study of Thermal Conductivity due to Spins in the One-Dimensional Spin System AFeX <sub>3</sub> (A=Rb, Cs; X=Cl, Br)	FMM-A-4
5	G. Korotcenkov, V. Brinzari, S.H. Han, L.B. Gulina, V.P. Tolstoy and B.K. Cho	SnO <sub>2</sub> Films Decorated by Au Clusters and Their Gas Sensing Properties	FMN-A-1
6	Kenji Takashima and Yukio Furukawa	Infrared Study on Electric Field Induced Structural Changes in Ferroelectric Vinylidene Fluoride/Trifluoroethylene Copolymer Thin Films	FMN-A-2
7	A. Bahtiar, L. Safriani, A. Aprilia, Risidiana, Harsojo, Triwikantoro, Darminto, A. Agung Nugroho, H. Guo, I. Kawasaki and I. Watanabe	Study of Charge Carrier Dynamics of P3HT:PCBM Blend for Active Material SolarCell Using Muon Spin Relaxation	FMN-A-3
8	Alfred Albert and Rosari Saleh	Synthesis of ZnO/TiO <sub>2</sub> and ZnO/TiO <sub>2</sub> /CuO Nanocomposite Using Sol-gel Method for The Photocatalytic Degradation of Methylene Blue Under UV and Visible Light Irradiation	FMN-A-4

9	Shofianina Jalaludin, Sarah Arifiyanti and Rosari Saleh	Magnetic Hybrid Fe <sub>3</sub> O <sub>4</sub> / CuO / TiO <sub>2</sub> Nano Particles: Synthesize, Characterization and Photocatalytic Activity	FMM-B-1
10	Yofentina Iriani, Retno Maharsi and Anif Jamaluddin	Characterization of Ba <sub>x</sub> Sr <sub>1-x</sub> TiO <sub>3</sub> Applied as Dielectric Material	FMM-B-2
11	Iis Nurhasanah, Aula Fitra Efendi, Heri Sutanto and Priyono	Structure and Growth of 5 mol % Zn-doped CeO <sub>2</sub> Nanosphere Synthesized by Simple Precipitation Process	FMM-B-3
12	Eni Sugiarti, Kemas A. Zaini, Yongming Wang, Naoyuki Hashimoto, Somei Ohnuki and Shigenari Hayashi	Effects of Oxidation Temperature on the Oxide Scale Formation of NiCoCrAl Coatings on Low Carbon Steel	FMM-B-4
13	Fahmi Astuti, Malik Anjelh Baqiya and Darminto	Effect of Pb on Superconducting and Electrical Properties of Bi <sub>2</sub> Sr <sub>2</sub> CaCu <sub>2</sub> O <sub>8+σ</sub> Nanopowders	FMN-B-1
14	Asep Ridwan Setiawan, Marsetio Noorprajuda, Aditianto Ramelan and Rochim Suratman	Preparation of Zn-ZrO <sub>2</sub> Nanocomposite Coating by DC and Pulsed Current Electrodeposition Technique with Low Current Density	FMN-B-2
15	Ariska Rinda Adityarini, Eka Yoga Ramadhan, Endah Retno Dyartanti and Agus Purwanto	Effect of LiFePO <sub>4</sub> Cathode Composite's Thickness on Lithium Battery Performance	FMN-B-3
16	Annisa Noorhidayati, Raynaldi Philipus, Nadia F. Djaja and Rosari Saleh	Comparative Study of Photocatalytic Activity of Ni-doped ZnO and Zeolite Supported Ni-doped ZnO Prepared by Co-precipitation Method	FMN-B-4
17	Ahmad Taufiq, Sunaryono, Edy Giri Rachman Putra, Suminar Pratapa and Darminto	Nano-structural studies on Fe <sub>3</sub> O <sub>4</sub> particles dispersing in a magnetic fluid using X-ray diffractometry and small-angle neutron scattering	FMN-B-5
18	Subagio A, Priyono, Pardoyo, Aswardi, Yudianti R., Subhan A. and Taer E	AC-MnO <sub>2</sub> -CNT Composites for Electrodes of Electrochemical Supercapacitors	FMN-B-6

19	Ananda Yogi Nugraheni, M. Nasrullah, Fandi Angga Prasetya, Fahmi Astuti and Darminto	Study on Phase, Molecular Bonding, and Bandgap of Reduced Graphene Oxide Prepared by Heating Coconut Shell	FMM-C-1
20	Decky J. Indrani, E. Budianto and B. Soegijono	Compression Strength and Degradation Ability of Hydroxyapatite/Alginate Composite Scaffolds	FMM-C-2
21	Is Fatimah, Dwiarso Rubiyanto and Thorikul Huda	Preparation and Characterization of Ni/Zr-Saponite as Catalyst in Catalytic Hydrogen Transfer Reaction of Isopulegol	FMM-C-3
22	Eny Kusriani, Gefin Yesya, Nyoman Suwartha, Cindy Rianti Priadi, and Nofrijon Sofyan	Characteristic of Equilibrium and Kinetic Studies for Adsorption of Fluoride Ions on Chitosan-Praseodymium	FMM-C-4
23	A.F. Rozlan, S.Sulaiman, M.I. Mohamed-Ibrahim and I. Watanabe	Electronic Structure of Muonated $\text{La}_2\text{CuO}_4$	FMN-C-1
24	Cukup Mulyana, Adhitya Rusel Syah and Nendi Suhendi	Simulation Analysis of Damage Mechanism on Material SA213-T22 Ferritic Type Caused of Temperature, Stress and Loading Using Finite Element Method Program	FMN-C-2
25	Melchor J. Potestas, Arnold C. Alguno, Reynaldo M. Vequizo, Bianca Rae B. Sambo and Majvell Kay G. Odarve	Optical property enhancement of silica-modified polyaniline grown on glass substrate via incorporation of zinc sulfide into the polymer matrix	FMN-C-3
26	Masruroh, D.J.D.H Djoko, Lalu A. Didik, Eka Rachmawati, Fadli Robiandi, Masdiana Pagaga and S.P Sakti	Effect of Solvents on Polystyrene Morphology and the Deposited Zinc Phthalocyanine (ZnPc) as Immobilisation Matrix for QCM Sensor	FMN-C-4



27	Abdul Halim Daulay, Decky Jusiana Indrani, Muhammad Rifqi AUFAN, Aditianto Ramelan, Mardjono Siswosuwarno and Bambang Sunendar Purwasasmita	Bone Scaffold Based on Biopolymer/Carbonate Apatite by Freeze Drying Method: Synthesis, Characterization, and In Vitro Cytotoxicity	FMM-D-1
28	Mochamad Chalid, Evana Yuanita and Juniko Pratama	Study of Alkalization to the Crystallinity and the Thermal Behavior of Arenga Pinnata "Ijuk" Fibers-based Poly(lactic acid) (PLA) Biocomposite	FMM-D-2
29	E. Taer, R. Taslim and M. Deraman	Preparations and Characterizations of Activated Carbon Monolith from Rubber Wood and its Affect on Supercapacitor Performances	FMM-D-3
30	Harsojo, Anna Layla Salfarina and Harini Sosiati	Fabricating Nano Fiber Polyvinylalcohol with Evenly Distributed Nano Silver	FMM-D-4
31	Rusinov P.O. and Blednova Zh. M	The Structure and Phase Formation of the Surface Layers Formed TiNiCu High Flame Spraying	FMN-D-1
32	Nadia Febiana Djaja and Rosari Saleh	Comparative study on photocatalytic performance of (Fe,La) and (Fe,Ce)-codoped ZnO nanoparticles	FMN-D-2
33	Heri Sutanto, Iis Nurhasanah and Eko Hidayanto	Deposition of Ag 2~6 mol%-doped ZnO Photocatalyst Thin Films By Thermal Spray Coating Method for Degradation E. coli Bacteria	FMN-D-3
34	Bidhari Pidhatika and Rupert Konradi	Peptidomimetic ultrathin films for biomaterial applications	FMN-D-4
35	Agus Haryono and Sri Budi Harmami	Synthesis of Iron Oxide Nanoparticles Coated with Dextrin and Their Structure	FMN-E-1
36	Rani Cahyani Fajaryatun, Therecia Wulan Sukardi, Arif Jumari and Agus Purwanto	Enhancement of Lithium Battery Performance by Thickness Anode Film Modification	FMN-E-2
37	Tika Paramitha, Tifa Paramitha and Agus Purwanto	Evaluation of Sintering and Soaking Methods on the Dye-sensitized solar cell Performance	FMN-E-3

38	Agus Sukarto Wismogroho, Wahyu Bambang Widayatno, Toto Sudiro and Didik Aryanto	The Orientation Study of BaSr - Hexaferrite Particles by Parallel Magnetic Field Press	FMN-E-4
39	Aniek S Handayani, Is Sulistiyati P and M.Chalid	Synthesis of Amylopectin Macro-initiator for Graft Copolymerization of Amylopectin-g- Poly(Methyl Methacrylate) by ATRP (Atom Transfer Radical Polymerization)	FMN-E-5
40	Annisa Noorhidayati, Mia P. Rahmawati and Rosari Saleh	Photocatalytic Activity of Plain ZnO compared to Zeolite Supported Transition Metal-(Co <sup>2+</sup> and Cr <sup>2+</sup> ) doped ZnO	FMN-E-6
41	Ardiansyah Taufik, Iqriah Kalim and Rosari Saleh	Preparation, characterization and photocatalytic activity of multifunctional Fe <sub>3</sub> O <sub>4</sub> / ZnO / CuO hybrid nanoparticles	FMN-E-7
42	Asep Ridwan Setiawan, Hugo Fathur Rahman Erawan, Rochim Suratman and M. Nasir	Synthesis of Cobalt Oxide Layer Via Electrospinning of PEO/Cobalt Acetate Solution on AISI 430 Ferritic Steels Substrate	FMN-E-8
43	Aula Fitra Efendi and Iis Nurhasanah	Synthesis of Zn-doped CeO <sub>2</sub> Nanopowders Assisted by Ultrasound Irradiation	FMN-E-9
44	I Made Joni, Dede Nurjaeni, Darmawan Hidayat, Tuti Aryati Demen, Dwindra W. Maulana and Camellia Panatarani	Development of Beads Mill with High Separation Efficiency Performance	FMN-E-10
45	Aventi	Comparison Between Fire Resistance Lightweight Brick And Fire Resistance Red Brick	FMN-F-1

46	A. Bahtiar, Siti Halimah Tusaddiah, Wendy Paramandhita S, Mustikasari, Lusi Safriani, Mariah Kartawidjaja, Kei Kanazawa, Ippei Enokida, Yukio Furukawa and Isao Watanabe	Optical, Structural and Morphological Properties of Ternary Thin Film Blend of P3HT:PCBM:ZnO Nanoparticles	FMN-F-2
47	Cukup Mulyana, Aswad Hi Saad, Otong Nurhilal and Mariah K	Failure Analysis on Disimilar Metal Weld (DMW) of Ferritic SA-213 T22 and Austenitic SA-213 TP 304H	FMN-F-3
48	Cukup Mulyana, Sri Suryaningsih and Mariah K	Disimilar Metal Weld Joint Power Plant	FMN-F-4
49	D.J.Djoko H.Santjojo, Masruroh and Fadli Robiandi	Functionality of ZnPc thin film deposited on polystyrene interlayer for immobilization of Biomolecules in QCM based biosensor	FMN-F-5
50	D. Dahlan, N. Sartika, Astuti and E. Taer	Effect of TiO <sub>2</sub> on Duck Eggshell Membrane as Separators in Supercapacitor Applications	FMN-F-6
51	Bambang Prihandoko, Tia Rahmiati and Anne Zulfia	Characteristic of Ceramic Composite Li <sub>4</sub> Ti <sub>5</sub> O <sub>12</sub> under Influence of Li <sub>2</sub> O	FMN-F-7
52	Indri Badria Adilina, Silvester Tursiloadi, and Shogo Shimazu	Development of Bentonite Clay Nanocomposites as Selective Catalysts for the Synthesis of Vanillin from Clove Oil Derivatives	FMN-F-8
53	Susilawati and Aris Doyan	Synthesis and Characterization of Solid Composite Polymer	FMN-F-9
54	Iwantono, Akrajas A. Umar, Erman Taer, Rika Taslim and Winda Nurwidya	Zink-oxide (ZnO) Nanorods Prepared by Seed-Mediated Growth Method as Active Materials Photoelectrochemical Solar Cell	FMN-F-10
55	Eko Pujiyanto, Pringgo Widyo Laksono and Sagiran	Synthesis and Sintering of Hydroxyapatite-Zirconia Composites	FMN-G-1

56	E. Taer, R. Taslim, Satri, Iwantono, B.N.M. Dolah and M. Deraman	The Investigations of a Composite Electrodes of Biomass Based Activated Carbon Mixed with Carbon Nanotube Sand Polyaneline for Supercapacitor Applications	FMN-G-2
57	Fandi Angga Prasetya, M. Nasrullah, Ananda Yogi Nugraheni, Salim Mustofa and Darminto	Analysis of Graphene Phase on Result of Heat Treatment on Coconut	FMN-G-3
58	Fitrilawati, Norman Syakir, Annisa Aprilia, Zhouyang Liu, Xinliang Feng, K. Muellen and Christoph Bubeck	Reduction Kinetic and Stability of Thermally Reduced Graphene Oxide Thin Films	FMN-G-4
59	Fitri Yuli Zulkifli, Nugroho Adi Saputro, Basari and Eko Tjipto Rahardjo	Left Handed Metamaterial Structure on Microstrip Antenna	FMN-G-5
60	Ghiska Ramahdita, Mochammad Chalid and Lisman Suryanegara	Potential Effects of Alkali Treatments on Chemical and Thermal Properties of Various Natural Cellulosic Fibers	FMN-G-6
61	H. S. Nusa, W. Astuti, A. S. Kartasasmita, R. Virgana, N. Syakir, A. Bahtiar, L. Safriani and Risdiana	Characterization of Optical and Structure Properties of Polydimethylsiloxanes	FMN-G-7
62	H. Sosiati, M. Muhaimin, Purwanto, D.A. Wijayanti, Harsojo, Soekrisno and K. Triyana	Microscopic characterization of cellulose nanocrystal isolated from sisal fibers	FMN-G-8
63	Harsojo, Anita F.W., and Harini Sosiati	A Simple Way of Fabricating Nano Fiber PVA Loaded with Superparamagnetic Fe <sub>3</sub> O <sub>4</sub>	FMN-G-9
64	H. Setiadi, A. Prasetyo, V. Suendo and A. A. Nugroho	Phonon Properties of Co:TiO <sub>2</sub> single crystal	FMN-G-10

65	L. Safriani, T. Susilawati, S. Hidayat and I. Sopian	Fabrication of Photonic Crystal Based on Colloidal Polystyrene Particles on Flexible Substrate	FMN-H-1
66	Jul Endawati	Durability of Wood Shavel Composites With Environmental Friendly Based Binder	FMN-H-2
67	Lusi Safriani, Risdiana, Ayi Bahtiar, Annisa Aprilia, I. Kawasaki and Isao Watanabe	$\mu$ SR study of charge carrier motion in active layer P3HT:ZnO:PCBM hybrid solar cells	FMN-H-3
68	Mastuki, Darminto and Malik Anjelh Baqiya	Explorative synthesis of calcium ferrite Ca-Fe-O by mixing precipitated $\text{CaCO}_3$ from limestone and iron sand extracted – $\text{Fe}_2\text{O}_3 \cdot \text{H}_2\text{O}$	FMN-H-4
69	Mochamad Chalid, Evana Yuanita and Dio Arifin	Study on Mechanical Properties of Recycle Polypropylene (rPP) -Calcium Carbonate ( $\text{CaCO}_3$ ) Composite	FMN-H-5
70	Nur Afifah and Rosari Saleh	Photocatalytic Activity of Fe- Doped ZnO/Montmorillonite Nanocomposite for Degradation of Malachite Green	FMN-H-6
71	Tjahjanti P.H and Setyawan E.H	Use Powder of Wood Ulin (Eusideroxylon Zwageri) for Mixed Materials Builders Head Bushing	FMN-H-7
72	Ahmad Said, Is Fatimah, Aprisilia Risky Wijaya and Uun Ayyil Hasanah	Preparation of Rice Straw-based Silica Gel: Effect of pH on Its Physicochemical Character and Catalytic Activity	FMN-H-8
73	Risdiana, D. Suhendar, S. Pratiwi, T. Saragi, W. A. Somantri, S. Harimurty, F. K. Muharom, S. F. Winda, R. R. Sihombing, M. R. Ramadhan and R. Tasomara	The Effects of Fe Impurities to the Magnetic Properties in Electron-doped Superconducting Cuprates	FMN-H-9
74	Gilang Gumilar, Brian Yulianto and Nugraha	Preparation of $\text{SnO}_2$ thin films with surfactants-assisted via low temperature chemical bath deposition method and its performance as CO gas sensor	FMN-H-10
75	Sahrul Hidayat, Orina Amelia, Iman Rahayu, and Fitrilawati	Conduction Properties of PTMSPMA-PEO and Its Application as Polymer Electrolyte in $\text{LiFePO}_4$ Batteries	FMN-I-1

76	Shirley Savetlana and Gusri Akhyar	The Effect of Grafit and NBR on the Hardness of Fly-ash/Phenolic Composite for Brake Lining Application	FMN-I-2
77	Dieni Mansur, Sri Fahmiati, Yulianti Sampora and Agus Haryono	Synthesis and Characterization of Polystyrene-Co-Maleic Acid-Cu as Biocide in Marine Biofouling	FMN-I-3
78	Sunaryono, Ahmad Taufiq, Suminar Pratapa, Zainuri, Triwikantoro and Darminto	Magnetic properties of Fe <sub>3</sub> O <sub>4</sub> nanoparticles synthesized from natural magnetites by coprecipitation method at room temperature with various stirring rate	FMN-I-4
79	Togar Saragi, Siti Nurjannah, Ricca Novia, Norman Syakir, Edward Simanjuntak, Lusi Safriani, Risdiana and Ayi Bahtiar	Particle Synthesis of Cobalt Ferrite by utilize Sol-Gel Method	FMN-I-5
80	Toto Sudiro, Kemas Ahmad Zaini Thosin, Didik Aryanto, Agus Sukarto Wismogroho and Kazuya Kurokawa	Fe-Si-Al Alloys Prepared by a Spark Plasma Sintering Technique	FMN-I-6
81	Sarah A. Arifin, Shofianina Jalaludin, Nadia F. Djaja and Rosari Saleh	The Preparation of Fe <sub>3</sub> O <sub>4</sub> /TiO <sub>2</sub> and Fe <sub>3</sub> O <sub>4</sub> /TiO <sub>2</sub> /CuO nanohybrids for photoreduction of Cr(VI)	FMN-I-7
82	Tuti Susilawati, Dwika Andjani, Sri Suryaningsih, Norman Syakir, and Fitrilawati	Corrosion Protection of Carbon Steel Pipe Using Polymer Hybrid with Inhibitor Cerium	FMN-I-8
83	Wiendartun, Risdiana, Fitrilawati, R. E. Siregar and Y. Koike	Influence of Nb <sub>2</sub> O <sub>5</sub> addition on the electrical properties of Fe <sub>2</sub> TiO <sub>5</sub> ceramics-based NTC thermistor	FMN-I-9
84	Lydia Anggraini and Kei Ameyama	Development of Hybrid Ceramics Composite through Microstructure Refinement	FMN-I-10
85	Wijang Wisnu R, Heru Sukanto, and Miftahul Anwar	Effect of soaking time in Alkali solution on the Interfacial Shear Strength of Cantala Fiber /Recycle HDPE Composites	FMN-J-1

86	Witta Kartika Restu, Yulianti Sampora, Yenny Meliana and Agus Haryono	Effect of Accelerated Stability Test on Characteristics of Emulsion Systems with Chitosan as a Stabilizer	FMN-J-2
87	Wiwik Pudjiastuti, Arie Listyarini and Arief Riyanto	Smart Cold System using Phase Change Materials (PCM's) to Preserve The Freshness of Seafood Products	FMN-J-3
88	Yayah Yuliah, Ayi Bahtiar, Sahrul Hidayat, Rustam E Siregar and Fitrilawati	Fluorescence Spectroscopy Study of PVP-capped ZnO Nano-particles as the Electron Acceptor of Organic Solar Cell Materials Poly(3-Hexylthiophene-2,5-diyl) (P3HT)	FMN-J-4
89	Decky J Indrani, Bambang S. Purwasmita and Jojo Simanjuntak	Magnetic Nanoparticles and Carbonate Apatite/Chitosan/Alginate Composite Scaffolds	FMN-J-5
90	Yenny Meliana, Sri Budi Harmami, Witta Kartika Restu and Agus Haryono	Morphology and Structure of Nanoencapsulation of Centella asiatica and Zingiber officinale Extract as The Oral Dosage of Anticellulite Treatment	FMN-J-6
91	Joko Triwibowo, Irvan Alamsyah and Jan Setiawan	Synthesis And Characterization Of Carbon-coated LiFePO <sub>4</sub> With Various Carbon Sources As Cathode Material For Lithium Ion Batteries Through A Solid-state Process	FMN-J-7
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93	Kiagus Dahlan, Akhiruddin Maddu, Setia Utami Dewi, Nur Aisyah Nuzulia, Sugandi, Fitri Afriani and Jayanti Dwi Hamdila	Synthesis of Porous Calcium Phosphate/Alginate Composites Using Chicken Eggshells as the Calcium Sources for Bone Tissue Scaffolds	FMN-J-9
94	W. A. Somantri, S. Pratiwi, D. Suhendar, M. R. Ramadhan, N. Sehendi, T. Saragi, and Risdiana	The Study of electron mobility in Electron-doped Superconductor Eu <sub>1.85+y</sub> Ce <sub>0.15-y</sub> Cu <sub>1-y</sub> Fe <sub>y</sub> O <sub>4+a-d</sub>	FMN-J-10

95	T. P. Negara, L. Yuliawati, A. D. Garnadi, S. Nurdiati and H. Alatas	Effect of Filling-Factor on Transmittance of a Dielectric Slab Waveguide with Metallic Grating	FMN-K-1
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97	Sidik Permana, Novitrian, Zaki Suud, Ismail and Mitsutoshi Suzuki	Heavy Nuclide Production Analysis For Different Burnup and Cooling Time of Light Water Reactor (LWR)	FMN-K-3
98	Moh. Toifur, Kusendratno, Rahmadhani and Riswanto	Performance of Several Wire Configuration Bridge (Wcb) Transducers to Handle The Low Temperature Sensor	FMN-K-4
99	Riesca Ayu Kusuma Wardhani, Lia Asri, Muhamad Nasir, Ida Suhadi and Bambang Sunendar	Electrospun Chitosan-Polyethylene Oxide Nanofiber Containing Botanical Collagen for Wound Dressing Application	FMN-K-5
100	Ferli S. Irwansyah, Dani G. Syarif, Atiek R. Noviyanti and Sahrul Hidayat	Synthesis and Characterization Composite $\text{La}_{9,33}\text{Si}_6\text{O}_{26}$ (LSO) - $\text{Zr}_{0,85}\text{Y}_{0,15}\text{O}_{1,925}$ (YSZ) as Electrolyte Solid Oxide Fuel Cell	FMN-K-6
101	M. A. Saleh, H. Kuhn, D. Onggo, A. A. Nugroho, and P.H.M. Van Loosdrecht	UV/Vis Spectroscopy of $(\text{C}_6\text{H}_5\text{CH}_2\text{CH}_2\text{NH}_3)_2\text{MnCl}_4$ single crystal	FMN-K-7
102	Kuwat Triyana, Elly Indahwati, Harsojo, Chotimah and Kamsul Abraha	Electrospun Gelatin Nanofibers Doped with Lithium Carbonate and Its Compatibility as Electrolyte Polymer in Lithium Ion Battery	FMN-K-8
103	Chotimah, Kuwat Triyana and Indriana Kartini	Effect of Annealing Temperature on Morphology and Composition of Electrospun PEDOT:PSS Nanofibers	FMN-K-9





# The Effects of Fe Impurities to the Magnetic Properties in Electron-doped Superconducting Cuprates

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## ABSTRACT

Effects of partially substitution of magnetic impurity Fe for Cu to the magnetic properties in electron-doped superconducting cuprates of  $\text{Eu}_{2-x+y}\text{Ce}_x\text{yCu}_{1-y}\text{Fe}_y\text{O}_{4+\delta}$ . with  $y = 0, 0.005, 0.010, 0.020,$  and  $0.030$  have been investigated in order to clarify electron-hole doping symmetry in high  $T_c$  superconductors. impurity-free samples of  $y = 0$ ,  $T_c$  onset is observed at about 15 K. For  $y = 0.005$ ,  $T_c$  onset decreases to be around 10 K. The trace of superconductivity disappeared at  $y = 0.020$ . The volume fraction of the superconducting state, VSC, decreases markedly from 100 % to 30 % with only 0.5 % impurity substitution. VSC is completely zero when the concentration of Fe is larger than 2 %. It is found that partially substitution of magnetic impurity Fe for Cu effectively decreased superconducting properties of electron-doped superconductor  $\text{Eu}_{2-x+y}\text{Ce}_x\text{yCu}_{1-y}\text{Fe}_y\text{O}_{4+\delta}$ .

## INTRODUCTION

**Development of  $T_c$  in Superconductor**

**Electron-Doped Vs Hole-Doped**

Electron-Doped Superconductor

ECCFO

Annealing

The value of oxygen reduction

Magnetic Properties

So in this case will be studied the effects of Fe impurities to the magnetic properties in electron-doped Superconducting cuprates

## METHODS & MATERIALS

$\text{Eu}_2\text{O}_3, \text{CeO}_2, \text{CuO}$

Prefired @900°C, 20 h

Sintered @1100°C, 20 h

Annealing

$\text{Eu}_{2-x+y}\text{Ce}_x\text{yCu}_{1-y}\text{Fe}_y\text{O}_{4+\delta}$   
 $y = 0, 0.005, 0.01, 0.02, 0.03$

X  
R  
D

SQUID

## RESULTS

**Fe content decrease the value of oxygen reduction in the same annealing condition**

Fe content (%)	Time (h)	Temperature (C)	$\delta$
0	8	850	0.0345
	11	850	0.04678
	12	850	0.0621
0.5	8	850	0.0297
	11	850	0.0473
	13	860	0.02745
1	8	850	0.0253
	10	850	0.0252
2	14.5	820	0.0407
	8	850	0.0249
3	10	830	0.0206
	12	850	0.0665
	8	850	0.0177
	10	830	0.0224
	12	850	0.0392

Impurity peaks due to de-composition of Cu

**Intensity (arb. units)**

$\text{Eu}_{1.85+y}\text{Ce}_{0.15-y}\text{Fe}_y\text{Cu}_{1-y}\text{O}_{4+\delta}$

$y = 0, \delta = 0.0621$

$y = 0.005, \delta = 0.02745$

$y = 0.01, \delta = 0.0252$

$y = 0.02, \delta = 0.0665$

$y = 0.03, \delta = 0.0392$

**$T_c$  onset**

$y = 0 \Rightarrow 15 \text{ K}$

$y = 0.5\% \Rightarrow 10 \text{ K}$

$y \text{ increases} \Rightarrow T_c \text{ decreases}$

**$\chi$**

$\chi = \frac{C}{T} = \frac{n\mu_0\mu^2}{3k_bT}$

$n\mu^2 = \frac{3k_bC}{\mu_0}$

$y \text{ increase} \Rightarrow n\mu^2 \text{ decrease}$

**$n\mu^2$**

## CONCLUSIONS

- $T_c$  decreases with decreasing Fe and disappear for  $y$  larger than 0.02 and 0.05. Impurity Fe successfully disturbing spin-spin correlation in Cu layer.
- Volume fraction of the superconducting state (VSC) decreases markedly from 100 % to 30 % with only 0.5 % impurity substitution. VSC is completely zero when the concentration of Fe is larger than 2 %.
- Partially substitution of magnetic impurity Fe for Cu effectively decreased superconducting properties of electron-doped superconductor  $\text{Eu}_{2-x+y}\text{Ce}_x\text{yCu}_{1-y}\text{Fe}_y\text{O}_{4+\delta}$ .

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