

From Molecular Electronics System (MES) to Advanced Nanotechnology: A Progress of Frontier Development

Hendry Izaac Elim^{a-g}

^aNanomaterials for Photonics Nanotechnology Laboratory (N4PN Lab.), Department of Physics, Faculty of Mathematics and Natural Sciences (FMIPA), Pattimura University (UNPATTI), Jl. Ir. M. Putuhena, Poka, Ambon, Indonesia 97233.

^bNanotechnology Research Center and Innovative Creation (PPNRI-LPPM), Research and Society Center of Pattimura University, UNPATTI, Jl. Mr. CHR. Soplanit, RumahTiga, Ambon, Indonesia 97234.

^cMultidisciplinary Research Center of Excellence (MrCE), UNPATTI, Jl. Dr. Leimena, Ambon, Indonesia 97234.

^dMultidisciplinary Bioinformatics Laboratory (MB Lab.), Biology Department, UNPATTI, Indonesia 97233.

^eTheoretical Physics Laboratory (TP Lab.), Department of Physics, FMIPA, UNPATTI, Jl. Ir. M. Putuhena, Poka, Ambon, Indonesia 97233.

^fSpecific Laboratory of Electronics and Instrumentation (Lab. ELINS), Physics Department, Pattimura University, Indonesia 97233.

^gAmbon Academy of Science and Arts, Ambon City, Maluku Province, Indonesia 97233.

*Corresponding author E-mail address: hendryelim@gmail.com (H.I. Elim)

ISSN: 2582-1598



Publication details

Received: 01st June 2020

Revised: 09th July 2020

Accepted: 13th July 2020

Published: 21st July 2020

Abstract: To engineer nanodevice and nanoelectronics system with a very low energy source and effective multitasking senses, it is necessarily to develop the understanding from molecular electronics system consisted of just limited atoms up to a hundred atoms to advance nanotechnology with the size of few nm. This progress of frontier development explains the use of electronic resistance among atoms rather than the normal system of vibrations in FTIR device for expand the knowledge of interactions and relationship among atoms up to nanoparticles. The question is which one came first, the vibration or the electronics? This paper will show the audience and readers how to understand and develop the above incredible things. A simple and convenient guidance is shown for easy learning with the core point by showing an example on how to conduct the work. Such discovery can be applied to the whole things in universe complex structures. Finally, one hopes that this article can resurrect many hopeless scientists caused by various types of broken earth because of the exponential growth of world populations in a static size of earth surface state.

Keywords: Nanoscientist; Beautiful mind; Advanced understanding; Molecular Electronic system.

1. Introduction

In the beginning of the living life on earth, GOD (YaHWeH/ Jehovah) created earth using a water molecule just like the fact that He is the living water.^[1] what a beautiful mind of Creator of this universe. Fig. 1 depicts the process of such remarkable knowledge and prominent understanding based on the conservation laws starting from zero to the expanded universe in His universe created by the eternal GOD (ELOHYM in Hebrews).^[1] This process was according to a very deep study for many years as a simple scientist or physicist.^[2-29] The contribution of this novel research may be useful for research students and nano-scientists for progressing their advanced works and its application in both nanotechnology system and its devices.

As the number of world population reaches more than seven billion people, more complex problems will happen including broken living environmental system. This systematic output is like the problem of aggregations and defects in material sciences which suffers the physical chemistry chemical physics characters of the material identified well by physicists and nanotechnologist.^[2-48] More

and more smart questions will arise to fight against such negative impacts as well as unsolved problems in ongoing research works and its development in particular for superhybrid system.^[32-34]

This paper offerings a simple solution by showing a manner in such a way so that all the points in main problems and related obstacles can be guided in the truth way with the salvation of many earthly people among the world complicated current problems and challenges. To simplify the answer and guidance for easy clarification, one derive a simple logic of molecular electronics system according to the electronic resistance among atoms rather than the normal system of vibrations usually in FTIR equipment for nanotechnology research. This novel idea can be implemented in the whole compound structures of universe.

2. Research Method and Theory

A simple beauty of research method and theory in this work provides an engineering step by step to build up nanoscience^[17] including nanomedicine^[3-6] as well as nanodevice and nanoelectronics system

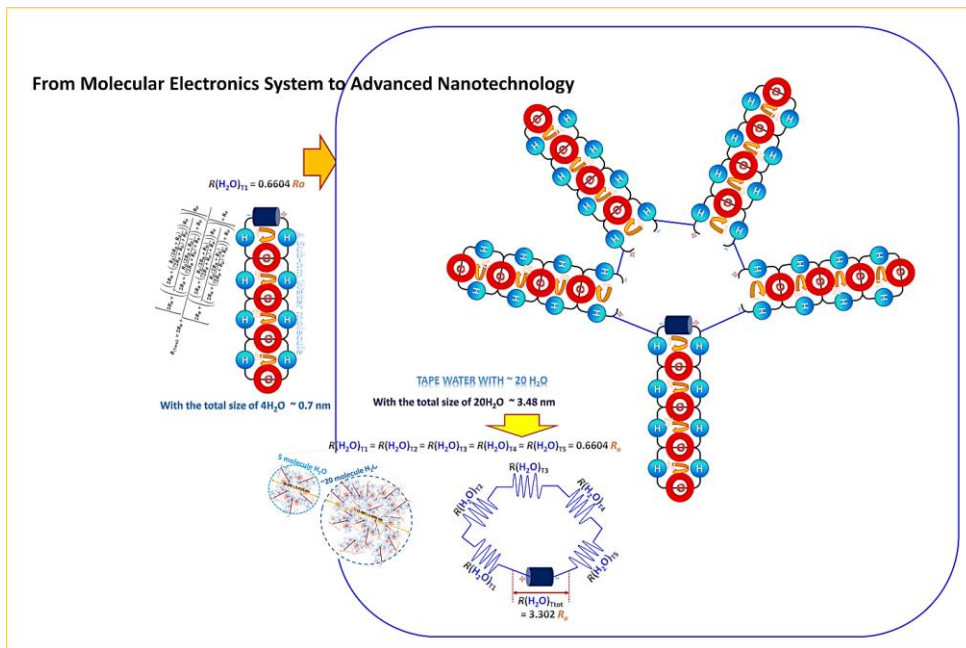


Fig. 1. The earth was created by water (Living H₂O Creature, 2 Pet. 3:5[0]): from molecular electronic system with a low resistance of ~ 0.66 R_o to advanced nanotechnology with complicated resistance, for example ~3.302R_o for current world tape water with its liquid molecule size of ~3.48 nm in diameter. The key point here is that as the molecular electronic structure is getting bigger size by additional molecules, the resistance is increased.

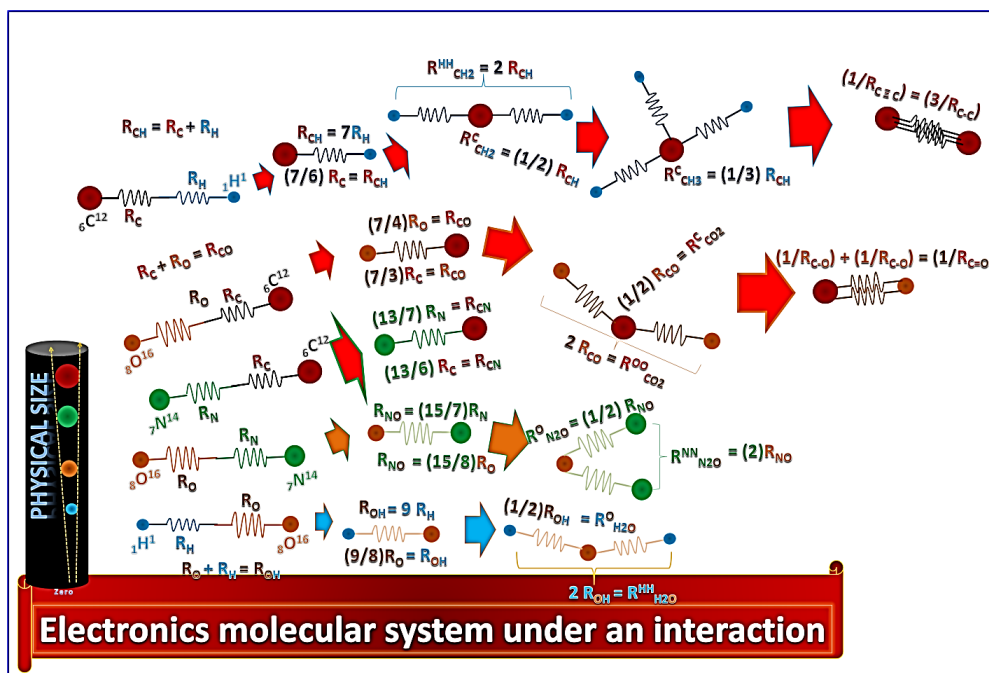


Fig. 2. Basic concept and interactions principle of molecular electronic system (MES) with their physical personality.^[48]

^[7-13] with a big hope in incorporating a very low energy source and effective multitasking senses.^[2-49] There are two important things in physics of universe.^[17-22-27] The first one is about size^[16,17] and another one is the type of interactions.^[19] These understanding are figured out in Fig.2 as the basic concept and principle as well as atomic interactions in molecular electronic system(MES), respectively. Therefore, the only works to carry out is the application and implementation of it all in real nanostructures. The only work to be developed for varies applications and development in engineering nano devices is its useable software for the convenient of another ordinary users.

3. Results and Discussions

The first successful application of the implementation of our research works using this interesting knowledge and simple deep understanding of electronics molecular system was in nanomedicine concept especially using the molecular system of herbal medicine^[4-6] for nm water and neo-flavonoid in zingiberaceae fruit called as Galoba fruit in Ambon, Indonesia with incredible high antioxidant content. We presented such explanation in an inventor international meeting of nanomedicine and nanotechnology scientists from all over the world in Las Vegas, USA on 19th April 2018. However, the

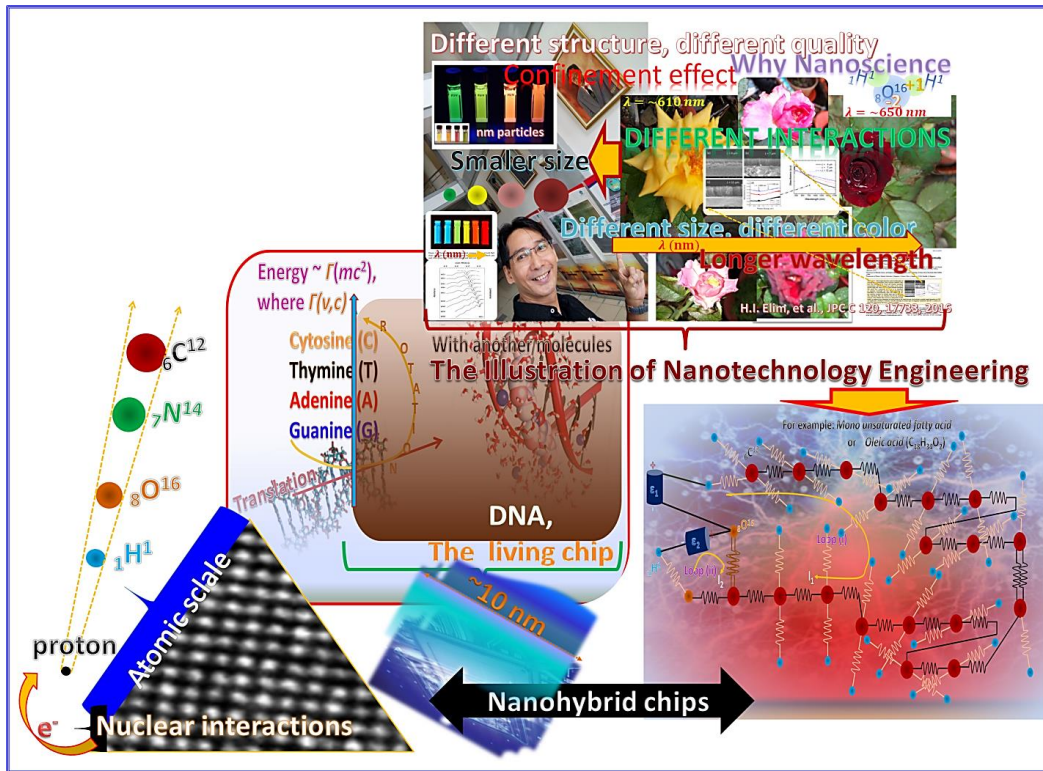


Fig. 3. A procedure to engineer nanodevice including nanohybrid chips from molecular electronic system to be nano-system.

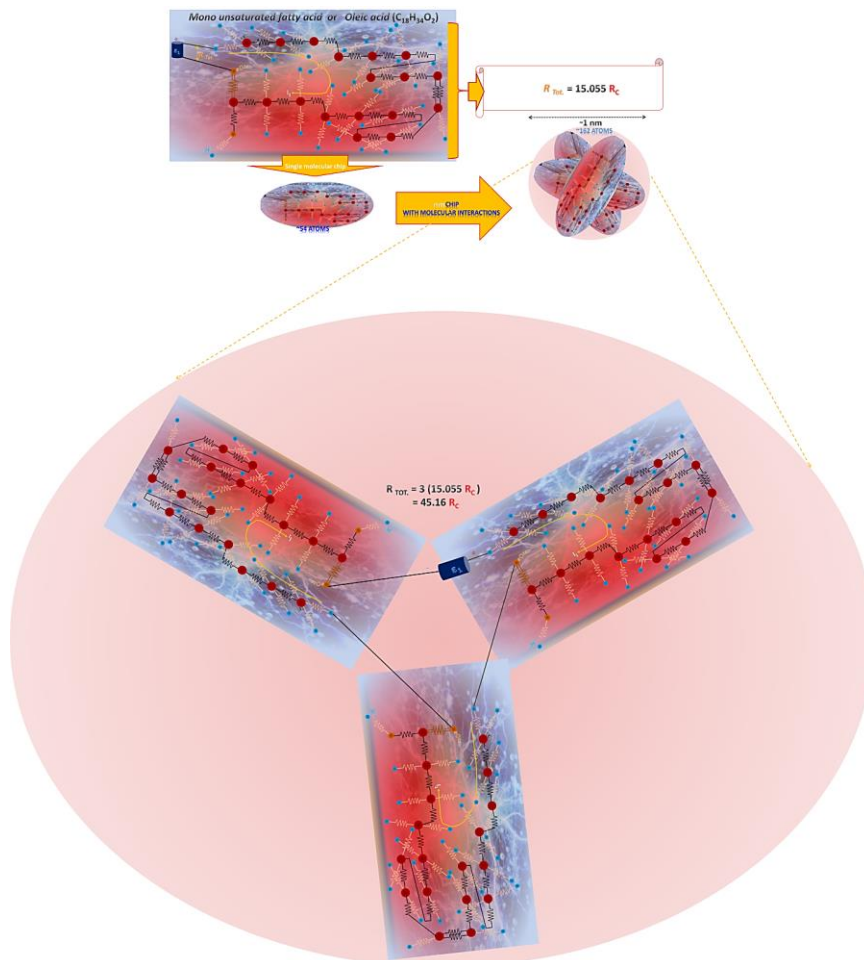


Fig. 4. The transformation understanding and its calculation of mono unsaturated fatty acid or oleic acid called as omega 9 (Ω9): from MES with the total resistance of ~15.06 RC to nano-aggregation of 3 serial interconnection molecules of Ω9 with resistance about ~45.16 RC.

detail on how to use our method is for the first time provided in present paper. Fig. 3 shows the real procedure to engineer such technique explained according to a series of our nanotechnology collaborative development in the last 15 years.^[29-48]

Fig. 3 shows a step by step of climbing a stair of understanding in solving nanotechnology problems especially associated with its core problem for extended improvement in the future. In such case, the first thing to carry out is the knowledge of molecular structure in this case is about your chemistry knowledge. The next part is to have physical knowledge of electronics understanding in physics of electronics and instrumentations (ELINS). Finally, the part by part careful calculation based on your physical mathematic knowledge to end it up with the main solution of total resistance counted from molecular structures up to nanostructures. Another important point in the Fig. 3 was obviously related to hybrid-system of organic matrix and inorganic nanoparticles^[32-34] with their super physical behaviors or either organic-organic or inorganic-inorganic nanostructures for example as shown in Refs.^[35-46] respectively. This coming super hybrid chips will incorporate DNA and nanostructures such as nm particles, nanowires/ nanotubes, and another 3D nm structures. A lot of marvellous works will be done to expose such amazing contributions by a huge collaboration of interdisciplinary scientist for future convenient life in very crowded human being activities on earth.

In order to show up the meaning of a nanomaterial part fabricated in a nanomedicine using mono unsaturated fatty acid (oleic acid) called as Omega 9 ($\Omega 9$) as depicted inside Fig. 3, one expose and describe it for instance in Fig. 4. By applying our research method and theory as shown inside Fig. 2, we obtain the total resistance of $\Omega 9$ as large as ~ 15.06 RC. While the nano-aggregation consisted of the interactions among a series of 3 molecules $\Omega 9$, the total resistance in nanostructure due to the aggregation is ~ 45.16 RC. This significant finding explains that aggregation of molecules will increase the total resistance. In the mind of optical knowledge such as refractive index (n), and transmittance (T)/ transparency will be poorer because of such aggregation. While absorption may increase as more imperfection or defects happen due to the interaction. Such similar observations had been observed both in the nonlinear system of nanostructures^[35-46] and linear nm structures of superhybrid materials.^[32-34] The point of this work is very helpful to expose the inner beauty of a significant electronic personality in nanostructure materials used to fabricate various nm chips.

4. Conclusions

In conclusion, a simple and convenient guidance for exposing the understanding of the total resistance in molecular electronics system that supports the electronics formation of nanostructures material for a better fabrication in nanotechnology business has been explained with simple example of calculation based on a good knowledge and understanding in physical system of materials. This findings particularly the research method and theory are good enough to help those who are interested indeed in developing an advanced nanotechnology using a simple thing in our daily complex life. It suggests that this article may contribute to resurrect many hopeless scientists due to various types of broken earth for example

caused by current new virus of COVID 19 that may be a trigger to attack lungs of people because of the exponential growth of both world populations and its multitasking technologies in a static size of earth surface state.

Acknowledgements

H.I.E is grateful to Pattimura university top leaders for their supports in developing research laboratory based on creativity of her each scientist. Such simple breakthrough work was funded by self-employed grant.

Conflicts of Interest

The authors declare no conflict of interest

References

- 1 Electronics Holy BIBLE, Sword, for instance: the book of JOB, chapter 38 verses 1 to 41, Job 1:1,8, 2 Peter 3:5, Acts 1:11, John 6:63,1 John 5:5-9 and Psalms 53:2-3. [\[Link\]](#)
- 2 Seife C. What Is the Universe Made Of? *Science*, 2005, **309**, 78. [\[CrossRef\]](#)
- 3 Elim H.I.; Zhai G. Control System of Multitasking Interactions between Society 5.0 and Industry 5.0: A Conceptual Introduction & Its Applications. *J. Phys.: Conf. Ser.*, 2020, **1463**, 012035. [\[CrossRef\]](#)
- 4 Elim H.I. Nanomedicine with Its Multitasking Applications: A View for Better Health. *IJHMCR*, 2017, **2**, 353-357. [\[CrossRef\]](#)
- 5 Elim H.I. Physics of Multitasking Nanomedicine, International Journal of Health Medicine and Current Research. *IJHMCR*, 2017, **2**, 509-519. [\[CrossRef\]](#)
- 6 Elim H.I.; Mapanawang A.L. Electronics Physical System of Large Antioxidant Structure in Herbal Medicine based Zingiberaceae Fruit: Understanding and Application. *Nanotechnol. Appl.*, 2018, **1**, 1-4. [\[CrossRef\]](#)
- 7 Elim H.I. Zhu Y.W.; Sow C.H. Length Dependence of Ultrafast Optical Nonlinear in Vertically Aligned Multiwalled Carbon Nanotube Films. *J. Phys. Chem. C*, 2016, **120**, 17733-17738. [\[CrossRef\]](#)
- 8 Darbar D.; Anilkumar M.R.; Rajagopalan V.; Bhattacharya I.; Elim H.I.; Ramakrishnappa T.; Ezema F.I.; Jose R.; Reddy M.V. Studies on Spinel Cobaltites, MCo_2O_4 ($M = Mn, Zn, Fe, Ni$ and Co) and their Functional Properties. *Ceram. Int.*, 2018, **44**, 4630-4639. [\[CrossRef\]](#)
- 9 Elim H.I.; Mapanawang A.L.; Reddy M.V. A Creative Proposal to Improve Woman and Child Health: from the Knowledge of Physical Nanoscience to Nanotechnology Implementation and Products. *CPQ Women and Child Health*, 2019, **1**, 1-11. [\[CrossRef\]](#)
- 10 Abhilash K.P.; Christopher Selvin P.; Nalini B.; Rajan Jose; Xia Hui H.; Elim I.; Reddy M.V. Correlation Study on Temperature Dependent Conductivity and line Profile along the LLTO/LFP-C Cross Section for all Solid-State Lithium-Ion Batteries. *Solid State Ion.*, 2019, **341**, 115032. [\[CrossRef\]](#)
- 11 Ria Kunwar.; Fabian I.; Ezema.; Midhun Harilal.; Syam G.; Krishnan Bhupender Pal.; Izan Izwan Misonon.; Mariappan C. R.; Elim H. I.; Chun-Chen Yang.; Rajan Jose. Pseudocapacitive Charge Storage in Thin Nanobelts. *Adv. Fiber Mater.*, 2019, **1**, 205-213. [\[CrossRef\]](#)
- 12 Elim H.I.; Reddy M.V.; Jose R. A Frontier 2D Nanobattery: "Improving Challenges (Hotumese) and Development". *Sci. Nat.*, 2019, **2**, 114-121. [\[CrossRef\]](#)
- 13 Elim H.I.; Rahman M.; Latupoho W.S.; Latukonsina R.R.; Pattipeilohy A.A.; Reddy M.V.; Jose R. Flexible Thin Battery with Fast and Sensitive Voltage Control by a Simple Mechanical Bending: No Energy without Working. *Sci. Nat.*, 2019, **2**, 157-166. [\[CrossRef\]](#)

- 14 Elim H.I.; Mapanawang A.L. The Attractive Differences of Two Types of Herbal Medicine from Zingiberaceae Fruit (Golobe Halmahera). *Int. J. Health Med. Curr. Res.*, 2018, **3**, 826-834. [[CrossRef](#)]
- 15 Mapanawang A.L.; Elim H.I. Unique Chemical Bonding Behavior of Love Herbal Medicine and Its Ability as a Chemotherapy. *Drug. J. Nanomed. Nanotechnol.*, 2018, **9**, 1000503. [[CrossRef](#)]
- 16 Elim H.I. Scientific Breakthrough Based on Natural Creation: "1 Diamond with 7 Eyes." *COJ Rev. Res.*, 2018, **1**, 1-4. [[CrossRef](#)]
- 17 Elim H.I. Nonlinear Optics and the Frontier of Nanoscience and Nanotechnology. Pattimura University Press, 1st Edition. 2019, 1-179. [[Link](#)]
- 18 Elim H.I. Theory, Implementation and the Nature of Truth (TIN) in Nanoscience, Nanotechnology, and Nanomedicine (NNN): From the Beginning of Universe to nm Scale Behavior. *Kenkyu J. Nanotechnol. Nanosci.*, 2019, **5**, 33-36. [[CrossRef](#)]
- 19 Elim H.I. Multitasking Herbal Nanomedicine: A Frontier Report. *Nanoscale Rep.*, 2019, **2**, 22-30. [[CrossRef](#)]
- 20 Hendry Izaak Elim. The Discovery of NEW Golobe and Its Amazing Healing System. *Sci. Nat.*, 2019, **2**, 66-70. [[CrossRef](#)]
- 21 Elim H.I. The First 1000 Atoms in Healing Process: From Nanotechnology to Nanomedicine. *Int. J. Health Med. Curr. Res.*, 2018, **3**, 1044-1046. [[CrossRef](#)]
- 22 Elim H.I. Metode Fisika Eksperimen: Pelengkap Teori Fisika: "To be Perfect like The 1 Who Created Our Incredible Universe", Pattimura university press, Indonesia, 1st Edition. 2019, 1-155. ISBN: 978-602-5943-05-8.
- 23 Mapanawang A.L.; Elim H.I. Chemical Bonding Character of Love Herbal Medicine: A Prominent Medicine Candidate for Preventing HIV virus. *Nanotechnol. Appl.*, 2018, **1**, 1-4. [[CrossRef](#)]
- 24 Seay I.F.; Elim H.I. The Observation of Fast, Long Term, and Stable Performance of Toxic Absorption in Herbal Blessing Product Based on Galoba Maluku (Zingiberaceae Fruits). *Sci. Nat.*, 2019, **2**, 122-127. [[CrossRef](#)]
- 25 Masrikat A.; Elim H.I. Unique Physical and Chemical Properties of Kian Sand Worm (Siphonosomaur-pulau) Traditional Medicine: Electrical, Optical and Chemical Response of Edible Powder with Different Sizes. *Biochem. Modern Appl.*, 2019, **2**, 51-54. [[CrossRef](#)]
- 26 Masrikat A.; Noya Y.; Elim H.I. Image Processing and Optical-Electricity Property of Traditional Medicine Products from Kian Sand Worm (Siphonosomaur-pulau). *Sci. Nat.*, 2019, **2**, 148-156. [[CrossRef](#)]
- 27 Elim H.I. Panduan Skripsi Sarjana Sains (S.Si). Pattimura University Press, 1st Edition, 2019, 1-44. [[Link](#)]
- 28 Elim H.I. Esther Kembauw.; Reico H.; Siahainenia; Jacobus S.A.; Lamerkabel.; Aphrodite M.; Sahusilawane.; Sri Wahyuni Djoko; Beni Setha. Heavenly Small Islands Simple Technology & Its Cultural Economy Impacts in Maluku, Indonesia: A New Proposed Multitasking Philosophy in Diversity (MPD). *Sci. Nat.*, 2019, **2**, 192-207. [[CrossRef](#)]
- 29 Elim H.I.; Wei Ji.; Mohan Singh Dhoni N.; Venkatram; Jian Yang.; Jim Yang Lee. Aspect-ratio Dependence of Optical Nonlinearities on Resonance with Longitudinal Surface Plasmon in Au Nanorods: Unique Character versus Common Behavior. *Sci. Nat.*, 2018, **1**, 1-7. [[CrossRef](#)]
- 30 Liu Y.J.; Sun X.W.; Elim H.I.; Ji W. Gain Narrowing and Random Lasing from Dye-Doped Polymer-Dispersed Liquid Crystals with Nanoscale Liquid Crystal Droplets. *Appl. Phys. Lett.*, 2006, **89**, 011111. [[CrossRef](#)]
- 31 Liu Y.J.; Sun X.W.; Elim H.I.; Ji W. Effect of Liquid Crystal Concentration on the Lasing Properties of Dye-Doped Holographic Polymer-Dispersed Liquid Crystal Transmission Gratings. *Appl. Phys. Lett.*, 2007, **90**, 011109 [[CrossRef](#)]
- 32 Elim H.I.; Bin Cai.; Okihiro Sugihara; Toshikuni Kaino; Adschiri T. Rayleigh Scattering Study and Particle Density Determination of High Refractive Index TiO₂ Nanohybrid Polymer. *Phys. Chem. Chem. Phys.*, 2011, **13**, 4470-4475. [[CrossRef](#)]
- 33 Elim H.I.; Bin Cai.; Yu Kurata; Toshikuni Kaino; Okihiro Sugihara; Tadafumi Adschiri; Ang-Ling Chu; Nobuyuki Kambe. Refractive Index control and Rayleigh Scattering Properties of Transparent TiO₂ Nanohybridpolymer. *J. Phys. Chem. B*, 2009, **113**, 10143-10148 [[CrossRef](#)]
- 34 Bin Cai.; Okihiro Sugihara; Elim H.I.; Toshikuni Kaino; Adschiri T. A Novel Preparation of High-Refractive-Index and Highly Transparent Polymer Nanohybrid Composites. *Appl. Phys. Express*, 2011, **4**, 092601. [[CrossRef](#)]
- 35 Elim H.I.; Sea-Ho Jeon; Sarika Verma; Wei Ji.; Loon-Seng Tan; Augustine Urbas; Long Y.; Chiang. Nonlinear Optical Transmission Properties of C60 Dyads Consisting of a Light-Harvesting Diphenylaminofluorene Antenna. *J. Phys. Chem. B*, 2008, **112**, 9561-9564. [[CrossRef](#)]
- 36 Elim H.I.; Jianying Ouyang; Suat Hong Goh; Wei Ji. Optical Limiting Based Materials of Mono-Functional, Multi-Functional and Supramolecular C60-Containing Polymers. *Thin Solid Films*, 2005, **477**, 63-72. [[CrossRef](#)]
- 37 Elim H.I.; Wei Ji.; Jian Yang; Jim Yang Lee. Intensity-Dependent Enhancement of Saturable Absorption in Pbs-Au₄ Nanohybrid Composites: Evidence for Resonant Energy Transfer by Auger Recombination. *Appl. Phys. Lett.*, 2008, **92**, 251106. [[CrossRef](#)]
- 38 Jian Yang; Elim H.I.; QingBo Zhang; Jim Yang Lee; Wei Ji. Rational Synthesis, Self-Assembly, and Optical Properties of PbS-Au Heterogeneous Nanostructures via Preferential Deposition. *J. Am. Chem. Soc.*, 2006, **128**, 11921-11926. [[CrossRef](#)]
- 39 Yanwu Zhu; Elim H.I.; Yong-Lim Foo; Ting Yu; Yanjiao Liu; Wei Ji.; Jim-Yang Lee; Zexiang Shen; Andrew Thye-Shen Wee; John Thiam-Leong Thong; Chong-Haur Sow. Multiwalled Carbon Nanotubes Beaded with ZnO Nanoparticles for Ultrafast Nonlinear Optical Switching. *Adv. Mater.*, 2006, **18**, 587-592. [[CrossRef](#)]
- 40 Elim H.I.; Wei Ji.; Meng-Tack Ng; Jagadese Vittal J. AgInSe₂ Nanorods: A Semiconducting Material for Saturable Absorber. *Appl. Phys. Lett.*, 2007, **90**, 033106. [[CrossRef](#)]
- 41 Elim H.I.; Ji W.; Yuwono A.H.; Xue J.M.; Wang J. Ultrafast Optical Nonlinearity in Polymethylmethacrylate -TiO₂ Nanocomposites. *Appl. Phys. Lett.*, 2003, **82**, 2691-2693. [[CrossRef](#)]
- 42 Lim S.H.; Elim H.I.; Gao X.Y.; Wee A.T.S.; Ji W.; Lee J.Y.; Lin J. Electronic and Optical Properties of Nitrogen-Doped Multiwalled Carbon Nanotubes. *Phys. Rev. B*, 2006, **73**, 045402. [[CrossRef](#)]
- 43 Bystrzejewski M.; Lange H.; Huczko A.; Elim H.I.; Ji W. Study of the Optical Limiting Properties of Carbon-Encapsulated Magnetic Nanoparticles. *Chem. Phys. Lett.*, 2007, **444**, 113-117. [[CrossRef](#)]
- 44 Boon-Kin Pong; Elim H.I.; Jian-Xiong Chong; Wei Ji.; Bernhardt L.; Trout Jim-Yang Lee. New Insights on Nanoparticle Growth Mechanism in Citrate-Reduction of Gold (III) Salt: Formation of Au Nanowire Intermediate and its Nonlinear Optical Properties. *J. Phys. Chem. C*, 2007, **111**, 6281. [[CrossRef](#)]
- 45 Kok Chung Chin; Amarsinh Gohel; Weizhe Chen; Elim H.I.; Wei Ji.; Ghee Lee Chong; ChongHaur Sow; Andrew Thye Shen Wee. Gold and Silver Coated Carbon Nanotubes: An Improved Broad-band Optical Limiter. *Chem. Phys. Lett.*, 2005, **409**, 85-88. [[CrossRef](#)]
- 46 Elim H.I.; Robinson Anandakathir; Rachel Jakubiak; Long Y.; Chiang; Wei Ji.; Loon-Seng Tan. Large Concentration-Dependent Nonlinear Optical Responses of Starburstiphenylamino-Fluorencarbonylmethano [60] Fullerene Pentads. *J. Mater. Chem.*, 2007, **17**, 1826-1838. [[CrossRef](#)]
- 47 Elim H.I.; Ronaldo Talapessy; Rafael Martinus Osok; Sawia; Eliyas Andreas. From Rubbish to a Large Scale Industry: A Simple Fabrication of Superfiberwith Multitasking Applications. *J. Environ. Sci. Eng. B*, 2015, **4**, 620-623. [[CrossRef](#)]
- 48 Elim H.I.; Talapessy R.; Sari N.A.B.R. Water Contaminated CaCO₃ and its Optical Process of Aggregation. *Int. J. Health Med. Curr. Res.*, 2016, **1**, 101-107. [[CrossRef](#)]
- 49 Elim H.I. Basic Universe of Molecular Electronics System (MES): Introduction and its Applications in Harvesting Daily Life. *Sci. Nat.*, 2019, **2**, 232-238. [[CrossRef](#)]



© 2020, by the authors. Licensee Ariviyal Publishing, India. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).