NOTO SUSANTO GULTOM

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EDUCATIONS

PhD National Taiwan University of Science and Technology, Materials Science and Engineering — 2017-2019
Advisor: Prof. Dong-Hau Kuo
Dissertation: *Development of Semiconducting Zinc Oxysulfide-Based Nano-Photocatalysts for Green, Sustainable, and High Efficient Hydrogen Production and Chemical Conversion*

MS National Taiwan University of Science and Technology, Materials Science and Engineering — 2015-2017
Advisor: Prof. Dong-Hau Kuo
Thesis: *Facile Synthesis of Indium Oxysulfide Photocatalyst for Hexavalent Chromium Detoxification and Hydrogen Evolution*

BS State University of Medan, Department of Physics — 2010-2014
Graduated Cum Laude

HONORS AND AWARDS

The best poster — 2019
On the 108th annual meeting of Materials Research Society Taiwan (MRST)-2019

The Phi Tau Phi Scholastic Honor Society for Academic Excellence of the Republic of China — 2019

NTUST Outstanding Youth — 2019

College Engineering Outstanding Student — 2018

Excellence in research — 2018
Awarded grant research scholarship by CTCI foundation, Taiwan.

The best poster — 2018
On the 13th National Conference on Hydrogen Energy and Fuel Cell, The 5th Taiwan Energy Association Annual Meeting-HEFC2018 at Yuan Ze University (10/20), Taiwan.

The best poster — 2018
On the 107th annual meeting of Materials Research Society Taiwan (MRST)-2018, at Feng Chia University (11/16-17), Taiwan

NTUST scholarship — 2017
Awarded full scholarship for doctoral program

NTUST Full scholarship — 2015
Awarded full scholarship for master program

RESEARCH INTEREST

Synthesis and characterizations of nanomaterials for several applications such as:

- ✓ Green, Sustainable, and High-Efficient Photocatalytic hydrogen production
- ✓ Hexavalent chromium detoxification
- ✓ Photo-chemicals conversion (4-nitrophenol to 4- aminophenol)
- ✓ Electrocatalysts for hydrogen evolution reaction (HER) and oxygen evolution reaction (OER)
- ✓ Zinc air battery

SKILLS

Instruments-handled

- X-ray diffractometer (D2Phaser)
- Field Emission-Scanning Electron Microscope (FE-SEM)
- Raman spectroscopy
- FTIR spectroscopy
- Photoluminescence spectroscopy
- UV-Vis spectrophotometer
- High-performance liquid chromatography (HPLC)
- Gas chromatography (GC)
- Electrochemical (LSV, CstV, EIS, CV, and Mott-Schottky)
- Zeta potential/ sizer
- Thermal gravimetric analysis (TGA)

Software analysis

- DM365_center finder for TEM analysis
- XPSPEAK41 for fitting XPS data
- DIFFRACT.EVA for crystallographic analysis
- ChemBioDraw Ultra for chemical schematic

SCIENTIFIC C SOCIETY

- International Association of Indonesian scientists /Ikatan Ilmuwan Indonesia International (I-4)
- Phi tau phi scholastic honor
- Materials Research Society Indonesia

PUBLICATIONS

International Journal (SCI)

[1] Hairus Abdullah, **Noto Susanto Gultom**, Dong-Hau Kuo. *Indium oxysulfide nanosheet photocatalyst for the hexavalent chromium detoxification and hydrogen evolution reaction*. Journal of Materials Science. 2017;52:6249-64. (IF=3.553, Q2)

[2] Hairus Abdullah, **Noto Susanto Gultom**, Dong-Hau Kuo. *A simple one-pot synthesis of a Zn(O,S)/Ga_2O_3 nanocomposite photocatalyst for hydrogen production and 4-nitrophenol reduction*. New Journal of Chemistry. 2017;41:12397-406 (IF=3.288, Q2)

[3] **Noto Susanto Gultom**, Hairus Abdullah, Dong-Hau Kuo. *Enhanced photocatalytic hydrogen production of noble-metal free Ni-doped Zn(O,S) in ethanol solution*. International Journal of Hydrogen Energy. 2017;42:25891-902. (IF=4.939, Q2)

[4] Hairus Abdullah, **Noto Susanto Gultom**, Dong-Hau Kuo, and Albert Daniel Saragih. *Cobalt-doped Zn(O,S)/Ga_2O_3 nanoheterojunction composites for enhanced hydrogen production*. New Journal of Chemistry. 2018. (IF=3.288, Q2)

[5] Yong-Xuan Hou, Hairus Abdullah, Dong-Hau Kuo, Sy-Jye Leu, **Noto Susanto Gultom**, Chi-Hung Su. *A comparison study of SiO_2/nano metal oxide composite sphere for antibacterial application*. Composites Part B: Engineering. 2018;133:166-76. (IF=7.635, Q1)

[6] Misganaw Alemu Zeleke, Dong-Hau Kuo, and Kedir Ebrahim Ahmed, **Noto Susanto Gultom**. *Facile synthesis of bimetallic $(In,Ga)_2(O,S)_3$ oxy-sulfide nanoflower and its enhanced photocatalytic activity for reduction of Cr(VI)*. Journal of Colloid and Interface Science. 2018;530:567-78. (IF=7.489, Q1)

[7] **Noto Susanto Gultom**, Hairus Abdullah, and Dong-Hau Kuo. *Facile synthesis of cobalt-doped (Zn,Ni)(O,S) as an efficient photocatalyst for hydrogen production.* Journal of the Energy Institute, 2018. 92 (2019) 1428-1439. (IF=4.748, Q2)

[8] Hairus Abdullah, **Noto Susanto Gultom**, and Dong-Hau Kuo, *Synthesis and characterization of La-doped Zn(O,S) photocatalyst for green chemical detoxification of 4-nitrophenol.* Journal of Hazardous Materials, 2019; 363: 109-118. (IF=9.038, Q1)

[9] Hairus Abdullah, Dong-Hau Kuo and **Noto Susanto Gultom** *N=N bond cleavage of azobenzene via photocatalytic hydrogenation with Dy-doped Zn(O,S): The progress from hydrogen evolution to green chemical conversion.* Catalysis Science & Technology, 2019. 9; p. 2651-2663 (IF=5.721, Q2)

[10] **Noto Susanto Gultom**, Hairus Abdullah, Dong-Hau Kuo and Wen-Cheng Ke. *Oriented p-n heterojunction Ag_2O/Zn(O,S) nanodiodes on mesoporous SiO_2 for photocatalytic hydrogen production.* ACS Applied Energy Materials, 2019; 2:3228-3236 (IF=4.473, Q2)

[11] **Noto Susanto Gultom**, Hairus Abdullah, and Dong-Hau Kuo. *Effect of graphene oxide and sacrificial reagent for the highly efficient hydrogen production with the costless Zn(O,S) photocatalyst*. International Journal of Hydrogen Energy, 44 (2019) 29516-29528. (IF=4.939, Q2)

[12] **Noto Susanto Gultom**, Hairus Abdullah, and Dong-Hau Kuo. *The Concept of Stagnant Capillarity Water in Nano Porous SiO2@(Zn,Ni)(O,S) Nanocomposite Photocatalyst as a Strategy to Improve Hydrogen Evolution.* ACS Applied Materials and interfaces 2019; 31: 27760-27769 (IF=8.758, Q1)

[13] Hairus Abdullah, **Noto Susanto Gultom**, Dong-Hau Kuo. *Depletion-Zone Size Control of p-type NiO/n-type Zn(O,S) Nanodiodes on High-Surface-Area SiO_2 Nanoparticles as a Strategy to Significantly Enhance Hydrogen Evolution Rate.* Applied Catalysis B: Environmental
2020, 261:118223 (IF=16.683, Q1)

[14] **Noto Susanto Gultom**, Hairus Abdullah, and Dong-Hau Kuo. *Phase transformation of bimetal zinc nickel oxide to oxysulfide photocatalyst with its exceptional performance to*

evolve hydrogen, Applied Catalysis B: Environmental, 272 (2020) 118985. (IF=16.683, Q1)

[15] Hairus Abdullah, Yu-Ro Ko, Dong-Hau Kuo, **Noto Susanto Gultom**, *Effects of Tin in La–Sn-Codoped Zn(O,S) Photocatalyst to Strongly Cleave the Azo Bond in Azobenzene with in Situ Generated Hydrogen*, ACS Applied Materials & Interfaces, 12 (2020) 16186-16199. (IF=8.758, Q1)

[17] Dong-Hau Kuo, Hairus Abdullah, **Noto Susanto Gultom**, Ji-Yu Hu. *Ag-Decorated MoSx Laminar-Film Electrocatalyst Made with Simple and Scalable Magnetron Sputtering Technique for Hydrogen Evolution: A Defect Model to Explain the Enhanced Electron Transport*, ACS Applied Materials & Interfaces, 12 (2020) 35011-35021. (IF=8.758, Q1)

[18] Hairus Abdullah, **Noto Susanto Gultom**, Hardy Shuwanto, W.L. Kebede, Dong-Hau. Kuo. *Self-Protonated Ho-Doped Zn(O,S) as a Green Chemical-Conversion Catalyst to Hydrogenate Nitro to Amino Compounds*, ACS Applied Materials & Interfaces, (2020). 12 (31), 35011-35021 (IF=8.758, Q1)

[19] Hardy Shuwanto, **Noto Susanto Gultom**, Hairus Abdullah, Dong-Hau Kuo. *Environmentally Benign Photoreactions for Hydrogen Production and Cleavage of N═N bond in Azobenzene over Co-Doped Zn(O,S) Nanocatalyst: The Role of In Situ Generated* H^+. ACS Applied Energy Materials, 2020. (2020). 3 (12): p. 12692-12702 (IF=4.473, Q2)

[20] J. Rajagukguk, P. Simamora, C.S. Saragih, H. Abdullah, **Noto Susanto Gultom**, A. Imaduddin, *Superparamagnetic Behaviour and Surface Analysis of* Fe_3O_4*/PPY/CNT Nanocomposites*, Journal of Nanomaterials 2020 (2020) 8174871. (IF=6.182, Q1)

[21] H. Shuwanto, H. Abdullah, D.-H. Kuo, **Noto Susanto Gultom**, *Surface active sites of Y-doped Zn(O,S) for chemisorption and hydrogenation of azobenzene and nitroaromatic compounds under light via self-generated proton*, Applied Surface Science 552 (2021) 149508.

[22] E.T. Bekele, E.A. Zereffa, **Noto Susanto Gultom**, D.-H. Kuo, B.A. Gonfa, F.K. Sabir, *Biotemplated Synthesis of Titanium Oxide Nanoparticles in the Presence of Root Extract of Kniphofia schemperi and Its Application for Dye Sensitized Solar Cells*, International Journal of Photoenergy 2021 (2021) 6648325. (IF=1.88, Q3)

[23] **Noto Susanto Gultom**, Hairus Abdullah, and Dong-Hau Kuo, *Transforming Zn(O,S) from UV to visible-light-driven catalyst with improved hydrogen production rate: Effect of indium and heterojunction*, Journal of Alloys and Compounds 869 (2021) 159316. (IF=4.65, Q1)

[24] H. Abdullah, C.-N. Hsu, H. Shuwanto, **Noto Susanto Gultom**, W.L. Kebede, C.-M. Wu, C.-C. Lai, R.-I. Murakami, M. Hirota, A.N. Nakagaito, D.-H. Kuo, *Immobilization of cross-linked In-doped* $Mo(O,S)_2$ *on cellulose nanofiber for effective organic-compound degradation under visible light illumination*, Progress in Natural Science: Materials International (2021). https://doi.org/10.1016/j.pnsc.2021.03.001 (IF=4.0, Q2)

[25] S. Shanmugasundaram, H. Abdullah, **Noto Susanto Gultom**, H. Shuwanto, D.-H. Kuo, *Influence of sulfur amount in Ni-incorporated* $ZnIn_2(O,S)_4$ *on phase formation and*

the visible light photocatalytic hydrogen evolution reaction, New Journal of Chemistry (2021) https://doi.org/10.1039/D1NJ01596F (IF=3.288, Q2)

[26] H. Abdullah, **Noto Susanto Gultom**, C.-C. Hsu, H. Shuwanto, D.-H. Kuo, *Amorphous-Ni(OH)$_2$ on a Vertically Grown Lamellar Ag-Modified MoSx Thin-Film Electrode with Surface Defects for Hydrogen Production in Alkaline Solutions*, ACS Applied Energy Materials 4(4) (2021) 3869-3880. (IF=4.473, Q2)

[27] **Noto Susanto Gultom**, D.-H. Kuo, H. Abdullah, C.-N. Hsu, *Fabrication of Ag_2S-MoS_x/MoNiAg film electrode by sputtering to enhance electrocatalytic hydrogen evolution in alkaline solution*, Materials Today Energy (2021) 100768. (IF=5.604, Q1)

[28] **Noto Susanto Gultom**, H. Abdullah, C.-N. Hsu, D.-H. Kuo, *Activating nickel iron layer double hydroxide for alkaline hydrogen evolution reaction and overall water splitting by electrodepositing nickel hydroxide*, Chemical Engineering Journal 419 (2021) 129608. (IF=10.652, Q1)

International Conference Paper (Scopus index)

[1] **Noto Susanto Gultom**, Hairus Abdullah, and Dong-Hau Kuo, *Convenient synthesis of Mn-doped Zn (O,S) nanoparticle photocatalyst for 4-nitrophenol reduction.* Journal of Physics: Conference Series, 2018. 1007(1): p. 012061.

[2] **Noto Susanto Gultom**, Hairus Abdullah, Dong-Hau Kuo, Pintor Simamora, and Makmur Sirait, *Development photocatalyst reduce graphene oxide (RGO) composited with (Zn,Ni)(O,S) for photocatalytic hydrogen production.* Journal of Physics: Conference Series, 2019. 1230 (1), 012102

[3] Hairus Abdullah, **Noto Susanto Gultom,** Dong-Hau Kuo, and Albert Daniel Saragih, *Effect of Zn(O,S) synthesis temperature to photocatalytic hydrogen evolution performance.* Journal of Physics: Conference Series 2019. 1230 (1), 012140

[4] Hairus Abdullah, **Noto Susanto Gultom,** Dong-Hau Kuo and Albert Daniel Saragih, *Hydrazine-modified Zn-oxysulfide nanoparticle for CO_2 reduction under low UV-light illumination.* Journal of Physics: Conference Series, 2019. 1230 (1), 012139

National Conference

[1] **Noto Susanto Gultom**, Hairus Abdullah, and Dong-Hau-Kuo, *A simple synthesis method of RGO/(Zn,Ni)(O,S) Nanocomposite for Photocatalytic Hydrogen Evolution Reaction.* The 13th National Conference on Hydrogen Energy and Fuel Cell, The 5th Taiwan Energy Association Annual Meeting－HEFC 2018, H_0_6, 10/19~ 10/20, Yuan Ze University, Taiwan. (Oral presentation)

[2] Hairus Abdullah, **Noto Susanto Gultom**, and Dong-Hau-Kuo, *Utilization of hydrazine-modified Zn(O,S) nanoparticles for photocatalytic reduction of CO_2.* The 13th National Conference on Hydrogen Energy and Fuel Cell, The 5th Taiwan Energy Association Annual Meeting－HEFC 2018, O_P_1, 10/19~ 10/20, Yuan Ze University, Taiwan. (Poster presentation)

[3] Hairus Abdullah, **Noto Susanto Gultom**, and Dong-Hau-Kuo, *Synthesis of Zn(O,S) Nanoparticles for Photocatalytic Hydrogen Evolution Reaction.* The 107th annual meeting of Materials Research Society Taiwan (MRST)-2018, P010038, 11/16~11/17, Feng Chia University, Taiwan. (Poster presentation)