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István-Attila Székely

Address:

ABOUT ME

I am from Cluj-Napoca, Romania, with a bachelor's degree in chemical engineering and an advanced chemical process engineering master's degree. During these years, I studied the morphology, structure, and optical properties of WO_3 semiconductors, respectively, and their photocatalytic performance in TiO_2/WO_3 composite systems. I also have some experience with mathematical modeling (based on kinetic data of photodegradation). During the Ph.D. years, our research focused on developing TiO_2/WO_3 and Au/TiO_2/WO_3 composite systems and their multiple applications (sensors, photocatalysts, adsorbents, and SERS materials).

WORK EXPERIENCE

13 JUN 2018 – CURRENT Cluj Napoca, Romania

UNIVERSITY RESEARCH ASSISTANT BABEȘ-BOLYAI UNIVERSITY

Synthesis of materials, preparation of composites.
Morpho-structural analysis of the samples; interpretation of results (FT-IR, XRD, Raman, DRS).

OCT 2012 – CURRENT Cluj Napoca, Romania

PROJECT MANAGER ÖSZTÖNDÍJAK.RO

Constant following of scholarships and presenting these opportunities for the students of the Babeș-Bolyai University, mainly for the Hungarian lines of study.

EDUCATION AND TRAINING

JAN 2017 – JUL 2017 Szeged, Hungary

ERASMUS+ MOBILITY PROGRAM Faculty of Physics, University of Szeged

Address Dóm Square nr. 9, 6720, Szeged, Hungary | **Website** http://www.physx.u-szeged.hu/

30 SEP 2016 – CURRENT Cluj Napoca, Romania

DOCTOR OF PHILOSOPHY Faculty of Physics, Babeș-Bolyai University

My research is focused on synthesizing Au/TiO2/WO3 composite systems and their multiple applications (sensors, photocatalysts, adsorbents, and SERS materials).

Address Mihail Kogălniceanu Street. nr. 1, 400084, Cluj Napoca, Romania |

Website http://phys.ubbcluj.ro/index_en.htm | **Field of study** Physics

30 SEP 2014 – 4 JUL 2016 Cluj Napoca, Romania

MASTER OF SCIENCE Faculty of Chemistry and Chemical Engineering, Babeș-Bolyai University

Advanced Process Chemical Engineering.

English Line of Study.

Address Arany János Street nr. 11, 400028, Cluj Napoca, Romania | **Website** http://www.chem.ubbcluj.ro/en/ |

Field of study Chemical engineering and processes

16 FEB 2015 – 30 JUN 2015 Szczecin, Poland

ERASMUS+ MOBILITY PROGRAM Faculty of Food Science and Fisheries, West Pomeranian University of Technology

Address Kazimierza Królewicza Street nr. 4, 71-550, Szczecin, Poland |

Website https://wnozir.zut.edu.pl/EN/contact.html

30 SEP 2010 – 4 JUL 2014 Cluj Napoca, Romania

BACHELOR'S DEGREE Faculty of Chemistry and Chemical Engineering, Babeș-Bolyai University

Chemistry and Engineering of Organic Compounds, Petrochemistry and Carbochemistry.
Hungarian Line of Study.

Address Arany János Street nr. 11, 400028, Cluj Napoca, Romania | **Website** http://www.chem.ubbcluj.ro/en/ |

Field of study Chemical engineering and processes

14 JUL 2003 – 14 JUL 2007 Miercurea Ciuc, Romania

HIGH SCHOOL GRADUATE Kós Károly High School

Address Topliţa Street nr. 20, 530241, Miercurea Ciuc, Romania |

Field of study Environmental sciences , Chemistry , Biology

LANGUAGE SKILLS

Mother tongue(s): **HUNGARIAN**

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
ROMANIAN	C1	C2	C1	C1	C2
ENGLISH	C1	C1	B2	C1	C2
GERMAN	A2	B1	A1	A2	B1
POLISH	A1	A1	A1	A1	A1

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

DIGITAL SKILLS

Social Media

Social Media (Facebook, Twitter, Instagram, LinkedIn)

Manuscript Writing and Editing

Microsoft Office | Microsoft Word | Microsoft Excel | Microsoft Powerpoint

Data Science and Data Analytics

OriginPro (Intermediate) | Analytical skills

Safely using cloud-based collaboration tools like Google Drive, DropBox, and Microsoft Teams

Google Drive | Google Docs

Communication Skills

Good listener and communicator | Motivated | Good written and oral communicator

Advanced Process Chemical Engineering related Specific Softwares

Good familiarity with MATLAB, Simulink | ASPEN ONE | ChemCad | Polymath

Coordination and Managerial Skills

Team player, Team Leader | Team-work oriented | Honest, Reliable and Trustworthy | Organizational and planning skills | Decision-making

Job Related Skills

Problem-Solver | Seriousness | Punctual | Results-Driven | Hardworking | Self-Motivated and Self-Learning

ADDITIONAL INFORMATION

INTERNSHIPS

MAR 2017 – APR 2017
Budapest University of Technology and Economics, Department of Physical Chemistry and Materials Science

JUN 2014 – JUL 2014
MVM Paks Nuclear Power Plant Ltd.

JUN 2013 – AUG 2013
Babeș-Bolyai University, Interdisciplinary Research Institute on Bio-Nano-Sciences

JUL 2012 – AUG 2012
Budapest University of Technology and Economics, Faculty of Chemical Technology and Biotechnology

SCHOLARSHIPS

AUG 2019 – JUN 2020
Homeland Study Grant

Funded by the Eötvös Loránd University and the Hungarian Ministry of Innovation and Technology.

SEP 2017 – AUG 2018
Collegium Talentum

Funded by the Sapientia Hungariae Foundation.

SEP 2016 – JUL 2017
Márton Áron College Research Fellowship

Funded by the Hungarian Ministry of Foreign Affairs and Trade.

SEP 2015 – JUL 2016
College Program for Gifted Students

Funded by the Balassi Institute.

SEP 2015 – OCT 2016
Students' Scientific Excellence Program

Funded by the Faculty of Chemistry and Chemical Engineering, Babeș-Bolyai University.

PROJECTS

23 JUN 2022 – 22 JUN 2024
PN-III-P2-2.1-PED-2021-3156 Nanocomposites based on recycled cellulose and carbon nanohorns for construction materials with improved resistance to fire action - Research Assistant.

23 JUN 2022 – 22 JUN 2024
PN-III-P2-2.1-PED-2021-2176 Application of bioactive nanocomposites in skin regeneration in rats with induced diabetes - Research Assistant.

DEC 2019 – 1 SEP 2022
PN-III-P1-1.1-TE-2019-1138 Bioactive composites used to stimulate bone regeneration in osteoporotic animals - Research Assistant.

DEC 2019 – 1 SEP 2022
PN-III-P1-1.1-TE-2019-1318 Magnetite-semiconductor based composites from natural and synthetic sources for water treatment processes - Research Assistant.

13 JUN 2018 – 10 DEC 2021
PN-III-P1-1.2-PCCDI-2017-0350 Using composite materials with graphene oxide to improve the performance of building and installation elements against fire action to ensure the protection of life in case of fire - Research Assistant.

2017 – 2018
PN-III-P1-1.1-MC-2018 Photogenerated electron transfer in inorganic (WO_3/TiO_2) and biological (WO_3/RC) systems - Project leader.

1 MAY 2017 – 10 DEC 2019
PN-III-P1-1.1-TE-2016-1588 The development of environmentally-friendly TiO_2/WO_3 and TiO_2/MoO_3 sensor-photocatalysts based on shape-tailored nanocrystals - Research Assistant.

2016 – 2017
PN-III-P1-1.1-MC-2017-0539 The effect of the pH upon the WO_3-WO_3•$0.33H_2O$-TiO_2 ternary composite systems' photocatalytic activity - Project leader.

2011 – 2014
PN-II-ID-PCCE-IDEI-3016/2011 Designing composite nanoarchitectures for hydrogen production and environmental depollution - Volunteer.

HONOURS AND AWARDS

27 SEP 2018
Augustin Maior Prize – Romanian Physics Society - Cluj Napoca Offered by the Romanian Physics Society-Cluj Napoca for the oral presentation "The effect of the pH adjustment upon the WO_3-WO_3•$0.33H_2O$-TiO_2 ternary composite systems' photocatalytic activity", at the 12^{th} International Conference On Physics Of Advanced Materials, in Heraklion, Greece.

14 MAY 2016
Second Place Prize – The Organization of Hungarian Students from Timișoara 17^{th} Scientific Student Conference on Technical Sciences, Timișoara, Romania, for the oral presentation of the paper with the title: "Kinetic modeling of methyl-orange degradation with WO_3-TiO_2 composite photocatalysts".

17 MAY 2014
Third Place Prize – Hungarian Student Association of Cluj-Napoca At the 17^{th} Transylvanian Scientific Student Conference on Real Sciences and Humanities, Cluj Napoca, Romania, for the oral presentation of the paper with the title: „Synthesis of WO_3 semiconductors from different precursors and study of the semiconductors' morphology and structure".

LANGUAGE EXAM

MAY 2018
Cambridge English Advanced (CAE) – (C1)

RESEARCHER PROFILES

Researcher ID

https://www.webofscience.com/wos/author/record/HKE-2806-2023

ORCID

https://orcid.org/0000-0002-8118-7107

Researchgate

https://www.researchgate.net/profile/Szekely-Istvan-2

Google Scholar

https://scholar.google.com/citations?user=T2VE_6cAAAAJ&hl=en

PUBLICATIONS

α-MoO3 with inhibitive properties in Fenton reactions and insights on its general impact on OH radical based advanced oxidation processes

– 2023
Authors: E-Z. Kedves, C. Fodor, Á. Fazekas, **I. Székely**, Á. Szamosvölgyi, A. Sápi, Z. Kónya, L. C. Pop, L. Baia, Z. Pap; Journal: Applied Surface Science

Tungsten oxide morphology-dependent Au/TiO2/WO3 heterostructures with applications in heterogenous photocatalysis and surface-enhanced Raman spectroscopy

– 2023
Authors: **I. Székely**, Z. Kovács, M. Rusu, T. Gyulavári, M. Todea, M. Focșan, M. Baia, Z. Pap; Journal: Catalysts

Experimental data-driven and phenomenological modeling approaches targeting the enhancement of CaTiO3 photocatalytic efficiency

– 2023
Authors: B. Boga, V-M. Cristea, **I. Székely**, F. Lorenz, T. Gyulavári, L. C. Pop, L. Baia, Z. Pap, N. Steinfeldt, J. Strunk; Journal: Sustainable Chemistry and Pharmacy

Structural and flame retardancy properties of GO-DOPO-HAK composite – 2023
Authors: A. G. Mihiș, L. C. Coteț, C. Cadar, L. C. Pop, M. Todea, M. M. Rusu, A. Vulpoi, **I. Székely**, C. A. Sălăgean, K. Magyari, M. Mureșan-Pop, O. Cadar, M. Baia, I. E. Sofran, G. Lisa, I. Anghel, M. Baibarac, V. Danciu, L. Baia; Journal: Journal of Materials Science

Rapid Synthesis Method of Ag3PO4 as Reusable Photocatalytically Active Semiconductor – 2023
Authors: Zs-R. Tóth, D. Debreczeni, T. Gyulavári, **I. Székely**, M. Todea, G. Kovács, M. Focșan, K. Magyari, L. Baia, Z. Pap, K. Hernádi; Journal: Nanomaterials

How does the structure of pullulan alginate composites change in the biological environment? – 2022
Authors: K. Magyari, A. Dreancă, **I. Székely**, A. Popescu, A. Feraru, E. Páll, T. Gyulavári, M. Suciu, M. Cenariu, E. Bobu, L. Baia, M. Baia; Journal: Journal of Materials Science

Sensor surface via inspiration from Nature: The specific case of electron trapping in TiO2/ WO3(·0.33H2O) and reaction center/WO3(·0.33H2O) systems

– 2022
Authors: B. Boga, **I. Székely**, M. Focșan, M. Baia, T. Szabó, L. Nagy, Z. Pap; Journal: Applied Surface Science

Suspension Based on a Mixture of Titania-Silica-Functionalized Graphene Oxide for Surface Consolidation of Historical Andesite Stone and Mortar

– 2021
Authors: L. C. Coteț, C. Sălăgean, A. Mihiș, **I. Székely**, Zs. Tóth, L. Baia, M. Baia, G. Olteanu, I. Olteanu, V. Danciu; Journal: Studia UBB Physica

Combination of iodine-deficient BiOI phases in the presence of CNT to enhance photocatalytic activity towards phenol decomposition under visible light

– 2021
Authors: N. Sharma, Z. Pap, **I. Székely**, M. Focșan, G. Karacs, Z. Nemeth, S. Garg, K. Hernádi; Journal: Applied Surface Science

Synthesis Design of Electronegativity Dependent WO3 and WO3·0.33H2O Materials for a Better Understanding of TiO2/WO3 Composites' Photocatalytic Activity

– 2021
Authors: **I. Székely**, E.Z. Kedves, Z. Pap, M. Baia; Journal: Catalysts

Mixture of Graphene Oxide/Phosphoric Acid/Melamine as Coating for Improved Fire Protective Performance and Enhancement of Surface Electrical Properties on Wood Chipboard

– 2021
Authors: L.C. Coteț, C. Cadar, A. Mihiș, K. Magyari, M. Mureșan-Pop, L.C. Pop, A. Mihăilă, **I. Székely**, S. Drăgan, M. Dudescu, I. Zgura, E. Matei, M. Baia, M. Baibarac, I. Anghel, L. Baia; Journal: Journal of Nanoscience and Nanotechnology

The effect of alkali and surfactant concentration, temperature and stirring on the cleaning efficiency of the carbon steel surface

– 2021
Authors: A. Mihiș, V. Danciu, C. A. Sălăgean, **I. Székely**, M. V. Racolța-Paina, S. C. Tripon, L. C. Coteț, K. Magyari, L. Baia; Journal: Studia UBB Physica

The effect of the pH adjustment upon the WO3-WO3·0.33H2O-TiO2 ternary composite systems' photocatalytic activity

– 2019
Authors: **I. Székely**, M. Baia, K. Magyari, B. Boga, Z. Pap; Journal: Applied Surface Science

The Comparison of the Photocatalytic Performance Shown by TiO2 and TiO2/WO3 Composites — A Parametric and Kinetic Study

– 2019
Authors: E.Z. Kedves, **I. Székely**, L. Baia, M. Baia, A. Csavdári, Z. Pap; Journal: Journal of Nanoscience and Nanotechnology

Detailed Spectroscopic and Structural Analysis of TiO2/WO3 Composite Semiconductors – 2018
Authors: B. Boga, **I. Székely**, Z. Pap, L. Baia, M. Baia; Journal: Journal of Spectroscopy

Synthesis of Shape-Tailored WO3 Micro-/Nanocrystals and the Photocatalytic Activity of WO3/TiO2 Composites

– 2016
Authors: **I. Székely**, G. Kovács, L. Baia, V. Danciu, Z. Pap; Journal: Materials

Preparation of TiO2/WO3 composite photocatalysts by the adjustment of the semiconductors' surface charge

– 2016
Authors: L. Baia, E. Orbán, Sz. Fodor, B. Hampel, E-Z. Kedves, **I. Székely**, É. Karácsonyi, B. Réti, P. Berki, A. Vulpoi, K. Magyari, A. Csavdári, Cs. Bolla, V. Coșoveanu, K. Hernádi, M. Baia, A. Dombi, V. Danciu, G. Kovács, Z. Pap; Journal: Materials Science in Semiconductor Processing

CONFERENCES AND SEMINARS

International conferences

1. **I. Székely**, K. Saszet, Zs-R. Tóth, T. Gyulavári, K. Magyari, M. Baia, "*Synergistic effect of monoclinic and partially hydrated WO_3 in $Au/TiO_2/WO_3$-WO_3·$0.33H_2O$ heterostructures for applications in heterogenous photocatalysis and SERS*", Oral presentation, 14th International Conference on Physics of Advanced Materials (ICPAM-14), Hybrid Conference, Dubrovnik, Croatia, 2022.
2. **I. Székely**, M. Rusu, M. Baia, Z. Pap, "*Synthesis of a multifunctional $Au/TiO_2/WO_3$ composite with multiple applications in heterogeneous photocatalysis*", Mini-oral presentation, 5th EuChemS Conference on Green and Sustainable Chemistry (5th EuGSC), Virtual Conference, Thessaloniki, Greece, 2021.
3. **I. Székely**, K. Saszet, M. Rusu, T. Gyulavári, M. Baia, Z. Pap, "*$Au/TiO_2/WO_3$ composites' multiple applicability as photocatalysts and SERS materials*", Oral presentation, 13th International Conference on Physics of Advanced Materials (ICPAM-13), Hybrid Conference, Sant Feliu de Guixols, Spain, 2021.
4. **I. Székely**, M. Rusu, M. Baia, Z. Pap, "*Applications of $Au/TiO_2/WO_3$ ternary composite systems as SERS materials and photocatalysts*", Oral presentation, 11th International Conference on Advanced Vibrational Spectroscopy (ICAVS 11), Online Conference, Kraków, Poland, 2021
5. .**I. Székely**, E.Z. Kedves, M. Baia, Z. Pap, "*The impact of different anions and cations electronegativity on WO_3's morphological, structural and photocatalytic properties*", Poster presentation, 2021 Spring Meeting of the European Materials Research Society (E-MRS), Virtual Conference, Strasbourg, France, 2021.
6. **I. Székely**, M. Baia, Z. Pap, K. Hernádi, "*Inducing surface defects in WO_3-WO_3•$0.33H_2O$-TiO_2 ternary composites and their photocatalytic efficiency for model pollutants removal*", Poster presentation, 6th European Conference on Environmental Applications of Advanced Oxidation Processes (EAAOP6), Portoroz, Slovenia, 2019.
7. **I. Székely**, M. Baia, Z. Pap, K. Hernádi, "*The effect of the pH adjustment upon the WO_3-WO_3•$0.33H_2O$-TiO_2 ternary composite systems' photocatalytic activity*", Oral presentation, **Augustin Maior Prize for Best**

Oral presentation, 12th International Conference on Physics of Advanced Materials (ICPAM-12), Heraklion, Crete, Greece, 2018.

8. M. Baia, L. Baia, **I. Székely**, Z. Pap, "*Ionic strength upon the structure and morphology of WO_3 semiconductors. Study of WO_3 and WO_3-TiO_2 composites photoactivity*", Poster presentation, 3rd World Congress on Materials Science & Engineering, Barcelona, Spain, 2017.
9. **I. Székely**, B. Boga, G. Kovács, Z. Pap, K. Hernádi, L. Baia. M. Baia, "*Assessment of photocatalytic and organic pollutant detection properties of TiO_2-WO_3 nanocomposite systems*", Poster presentation, 5th European Conference on Environmental Applications of Advanced Oxidation Processes (EAAOP5), Prague, Czech Republic, 2017.

National conferences

1. **I. Székely**, B. Boga, A. Csavdári, G. Kovács, Z. Pap, M. Baia, K. Hernádi, "*Application of WO_3-TiO_2 based semiconductor nanomaterials as photocatalysts for the removal of dyes*", Oral presentation, Transylvanian Museum Association, ETK-17, Cluj-Napoca, Romania, 2017.
2. **I. Székely**, B. Boga, A. Csavdári, G. Kovács, Z. Pap, M. Baia, K. Hernádi, "*A Novel WO_3-TiO_2 Based Composite Semiconductors: Synthesis, Morpho-structural Analysis and Photocatalytic Activity Assessment*", Oral presentation, XXII. International Conference on Chemistry, Timișoara, Romania, 2016.

Other International conferences

1. B. Boga, N. Steinfeldt, V. Cristea, F. Lorenz, **I. Székely**, T. Gyulavári, Z. Pap, J. Strunk, "*Correlation between hydrothermal synthesis conditions – morpho-structural peculiarities – photocatalytic efficiency of $CaTiO_3$ and $SrTiO_3$*", Poster presentation, 55th Jahrestreffen Deutscher Katalytiker, Weimar, Germany 2022.
2. K. Magyari, A. Dreanca, **I. Székely**, E. Bobu, E. Páll, M. Cenariu, L. Baia, M. Baia, "*In Vitro Bioactivity and Biocompatibility of Alginate-Pullulan Based Composites*", Oral presentation, New Trends in Polymer Science: Health of the Planet, Health of the People, Turin, Italy, 2022.
3. Fodor C., Kedves E.-Z., **Székely I**., Pop L.-C., Baia L. "*Preparation of α-MoO3 with different crystallographic plane ratios: study of the adsorption process using organic dyes*", Oral presentation, 9th European Young Engineers Conference, Online Conference, Warsaw, Poland, 2021.
4. B. Boga, **I. Székely**, T. Gyulavári. M-V. Cristea, Z. Pap, "*Synthesis design of $CaTiO_3$ and the assessment of photoreactor design parameters*", Oral presentation, *Supervisor*, 5th EuChemS Conference on Green and Sustainable Chemistry (5th EuGSC), Virtual Conference, Thessaloniki, Greece, 2021.
5. B. Boga, **I. Székely**, T. Gyulavári. M-V. Cristea, Z. Pap, "*Synthesis design of $CaTiO_3$ and the assessment of photoreactor design parameters*", Oral presentation, *Supervisor*, 5th EuChemS Conference on Green and Sustainable Chemistry (5th EuGSC), Virtual Conference, Thessaloniki, Greece, 2021.
6. B. Boga, M-V. Cristea, **I. Székely**, Z. Pap, "*Hydrothermal Synthesis of $CaTiO_3$ and Photocatalytic Performance Optimization Using Statistical Models*", Oral presentation, *Supervisor*, 22nd Technical Scientific Student Conference, Timișoara, Romania, 2021, (1st Place Prize).
7. N. Sharma, Z. Pap, S. Garg, K. Hernádi, **I. Székely**, "*Investigating role of $Bi_6O_6(OH)_3(NO_3)_3 \bullet 1.5H_2O$ as intermediate compound in BiOBr/MWCNT composites with (003) facet favoring phenol degradation under visible light*", Poster presentation, 6th European Conference on Environmental Applications of Advanced Oxidation Processes (EAAOP6), Portoroz, Slovenia, 2019.
8. B. Boga, **I. Székely**, K. Hajdu, G. Kovács, Z. Pap, M. Baia, K. Hernádi, L. Nagy, "*Bioelectronic and photocatalytic application of composite systems based on WO_3 and mathematical modelling of oxalic acid degradation using WO_3/TiO_2 composites*", Oral presentation, *Supervisor*, 15th International Conference "Students for Students", Cluj-Napoca, Romania, 2019.

Other National conferences

1. B. Boga, **I. Székely**, M. Focșan, Z. Pap, "*The specific case of electron trapping in reaction centre/ WO_3($\cdot 0.33H_2O$) and TiO_2/WO_3($\cdot 0.33H_2O$) systems*", Student poster presentation, *Supervisor*, XXVI. International Conference on Chemistry, Online Conference, Romania, 2020.
2. B. Boga, **I. Székely**, T. Szabó, A. M. V. Brânzanic, G. Kovács, Z. Pap, M. Baia, L. Nagy, K. Hernádi, L. Nagy, "*Computational and Experimental Study of RC/WO_3 Based Biohybrid System*", Student poster presentation, *Supervisor*, XXV. International Conference on Chemistry, Cluj-Napoca, Romania, 2019.
3. B. Boga, **I. Székely**, R. Csekő, G. Kovács, Z. Pap, M. Baia, K. Hernádi, L. Nagy, "*Photogenerated Electron Transfer in Biological (WO_3/RC) and Inorganic (WO_3/TiO_2) System*", Student poster presentation, *Supervisor*, XXIV. International Conference on Chemistry, Sovata Băi, Romania, 2018.
4. L.C. Pop, **I. Székely**, M. Rusu, A. Vulpoi, C.I. Fort, L. Baia, C. Coteț, *"Nanoporous Carbons Impregnated with Bi-Fe Nanoparticles and Modified with TiO_2, Study of Their Photocatalytic Activity"*, Poster presentation, XXIII. International Conference on Chemistry, Deva, Romania, 2017.
5. B. Boga, **I. Székely**, K. Hajdu, G. Kovács, Z. Pap, M. Baia, K. Hernádi, L. Nagy, "*The Characterization and the Applicability of Composite Systems Based on WO_3*", Student poster presentation, *Supervisor*, XXIII. International Conference on Chemistry, Deva, Romania, 2017.