

## Curriculum Vitae

Name: Imre Szenti, PhD  
Date of birth: 08/08/1983  
Place of Birth: Hódmezővásárhely (Csongrád, Hungary)  
Workplace: Research associate at University of Szeged (SZTE), Department of Applied and Environmental Chemistry, H-6720 Szeged, Rerrich B. sqr 1., Hungary  
Contact info: szenti@chem.u-szeged.hu  
Scientific Degree: Ph.D. (2020)  
Education: 2013 – 2017: Ph.D, student at University of Szeged, Environmental Sciences Doctoral School.  
2008 – 2013: MSc in Chemistry, at University of Szeged  
Language skills: English

### Workplaces

2013 - : SZTE, Department of Applied and Environmental Chemistry  
2019 - : ELKH-SZTE Reaction Kinetics and Surface Science Research Group

### Research Interest

surface science, solid-gas interactions and dynamics, characterization of adsorbed species and surface intermediates, catalysis, electron spectroscopy, computed tomography

### Scientific activities of the last 5 years:

Synthesis of thin-layer films on metal single crystal surfaces under ultra-high vacuum and investigation of the catalytic activity of metal clusters deposited on them.

Heterogeneous catalytic reactions, surface chemistry and other surface chemical processes (eg CO<sub>2</sub> hydrogenation).

Application of high-resolution computed tomography (micro-CT) in materials

### Scientific Trips

2018 : Bruker/SkyScan micro-CT training, Antwerpen, Belgium.  
2015 : Friderich Alexander University Erlangen-Nürnberg.

### Awards

2021: National Excellence Program - Postdoctoral  
2020: National Excellence Program - Postdoctoral  
2017: National Excellence Program - Doctoral Candidate Scholarship  
2015: Campus Hungary Scholarship

### Publication activity

51 scientific articles,

## Publication list

- 1 Yadav, M., Szenti, I., Ábel, M., Szamosvölgyi, Á., Ábrahámné, K.B., Kiss, J., Zsolt, P., Sápi, A., Kukovecz, Á., Kónya, Z. Concentrated Platinum-Gallium Nanoalloy for Hydrogen Production from the Catalytic Steam Reforming of Ethanol, (2023) 15 (1)  
<https://doi.org/10.1002/cctc.202200717>
- 2 Ósi, A., Barrett, P.M., Evans, A.R., Nagy, A.L., Szenti, I., Kukovecz, Á., Magyar, J., Segesdi, M., Gere, K., J6, V. Multi-proxy dentition analyses reveal niche partitioning between sympatric herbivorous dinosaurs, (2022) 12 (1)  
**DOI:** [10.1038/s41598-022-24816-z](https://doi.org/10.1038/s41598-022-24816-z)
- 3 Gait, J., Bajnok, K., Szilágyi, V., Szenti, I., Kukovecz, Á., Kis, Z. Quantitative 3D orientation analysis of particles and voids to differentiate hand-built pottery forming techniques using X-ray microtomography and neutron tomography, (2022) 14 (12),  
**DOI:** [10.1007/s12520-022-01688-y](https://doi.org/10.1007/s12520-022-01688-y)
- 4 Sharma, S., Wang, F., Rao, P.V.K., Agrawal, A.K., Jassal, M., Szenti, I., Kukovecz, Á., Rawal, A., Schiller, U.D.  
Unfolding the effects of decontamination treatments on the structural and functional integrity of N95 respirators via numerical simulations, (2022) 12 (1)  
**DOI:** [10.1038/s41598-022-08150-y](https://doi.org/10.1038/s41598-022-08150-y)
- 5 Szabó, M., Kundrata, R., Hoffmannova, J., Németh, T., Bodor, E., Szenti, I., Prosvirov, A.S., Kukovecz, Á., Ósi, A. The first mainland European Mesozoic click-beetle (Coleoptera: Elateridae) revealed by X-ray micro-computed tomography scanning of an Upper Cretaceous amber from Hungary, (2022) 12 (1)  
**DOI:** [10.1038/s41598-021-03573-5](https://doi.org/10.1038/s41598-021-03573-5)
- 6 Szabó, M., Brazidec, M., Perrichot, V., Szenti, I., Kukovecz, Á., Ósi, A. A unique record of the Late Cretaceous of East-Central Europe: The first fossil wasps (Hymenoptera: Bethyridae, Spathiopterygidae) from the ajkaite amber (Bakony Mts., western Hungary), (2022) 139  
<https://doi.org/10.1016/j.cretres.2022.105314>
- 7 Chawla, H., Garg, S., Rohilla, J., Szamosvölgyi, Á., Efremova, A., Szenti, I., Ingole, P.P., Sápi, A., Kónya, Z., Chandra, A. Visible LED-light driven photocatalytic degradation of organochlorine pesticides (2,4-D & 2,4-DP) by Curcuma longa mediated bismuth vanadate, (2022) 367  
**DOI:** [10.1016/j.jclepro.2022.132923](https://doi.org/10.1016/j.jclepro.2022.132923)
- 8 Grubeša, I.N., Marković, B., Nyarko, M.H., Krstić, H., Brdarić, J., Filipović, N., Szenti, I., Kukovecz, Á. Potential of fruit pits as aggregate in concrete, (2022) 345  
<https://doi.org/10.1016/j.conbuildmat.2022.128366>
- 9 Vrdoljak, I., Brdarić, J., Rupčić, S., Marković, B., Miličević, I., Mandrić, V., Varevac, D., Tatar, D., Filipović, N., Szenti, I., Kukovecz, Á. The Effect of Different Nanomaterials Additions in Clay-Based Composites on Electromagnetic Transmission, (2022) 15 (15)  
<https://doi.org/10.3390/ma15155115>
- 10 Szamosvölgyi, Á., Rajkumar, T., Sápi, A., Szenti, I., Ábel, M., Gómez-Pérez, J.F., Baán, K., Fogarassy, Z., Dodony, E., Pécz, B., Garg, S., Kiss, J., Kukovecz, Á., Kónya, Z. Interfacial Ni active sites strike solid solution counterpart in CO<sub>2</sub> hydrogenation, (2022) <https://doi.org/10.1016/j.eti.2022.102747>
- 11 Bartus, C.P., Hegedűs, T., Kozma, G., Szenti, I., Vajtai, R., Kónya, Z., Kukovecz, Á. Exfoliation of black phosphorus in isopropanol-water cosolvents, (2022) 1260  
<https://doi.org/10.1016/j.molstruc.2022.132862>
- 12 Singh, B., Gupta, A., Singh, D., Shukla, S., Vásárhelyi, L., Szenti, I., Kukovecz, A., Rawal, A. Structural health monitoring of nonwoven materials via self-similar arrays of carbon nanotubes, (2022) 32.  
<https://doi.org/10.1016/j.coco.2022.101155> Get rights and content

13 Sharma, S., Wang, F., Kumar, S., Nawal, R.R., Kumar, P., Yadav, S., Szenti, I., Kukovecz, A., Schiller, U.D., Rawal, A. Structural and functional integrity of decontaminated N95 respirators: Experimental results, (2022) 51 (5\_suppl), pp. 7999S-8017S.

<https://doi.org/10.1177/15280837221082322>

14 Takács, T., Abdelghafour, M.M., Lamch, Ł., Szenti, I., Sebők, D., Janovák, L., Kukovecz, Á. Facile modification of hydroxyl group containing macromolecules provides autonomously self-healing polymers through the formation of dynamic Schiff base linkages (2022) 168

<https://doi.org/10.1016/j.eurpolymj.2022.111086>

15 Boldizsár, T., Mucsi, R., Szamosvölgyi, Á., Szenti, I., Halasi, G., Sápi, A., Kukovecz, Á., Kónya, Z. Optimization of ceramic-based noble metal-free catalysts for CO oxidation reactions, (2022) 135 (2), pp. 575-587.

<https://doi.org/10.1021/acscatal.6b00677>

16 Khoshroo, G., Sápi, A., Szenti, I., Efremova, A., Bali, H., B.Ábrahámné, K., Erdőhelyi, A., Kukovecz, Á., Kónya, Z. Pure Ni-Based and Trimetallic Ni-Co-Fe Catalysts for the Dry Reforming of Methane: Effect of K Promoter and the Calcination Temperature, (2022)

[DOI:10.1007/s10562-022-04203-z](https://doi.org/10.1007/s10562-022-04203-z)

17 Al-Aqtasha, O., Farkas, F., Sápi, A., Szenti, I., Boldizsár, T., B.Ábrahámné, K., Kukovecz, Á., Kónya, Z. Differently shaped Al<sub>2</sub>O<sub>3</sub>-based Pd catalysts loaded catalytic converter for novel non-road mobile machinery exhaust systems (2022)

[DOI:10.1007/s11144-022-02291-x](https://doi.org/10.1007/s11144-022-02291-x)

18 Efremova, A., Szenti, I., Kiss, J., Szamosvölgyi, Á., Sápi, A., Baán, K., Olivi, L., Varga, G., Fogarassy, Z., Pécz, B., Kukovecz, Á., Kónya, Z. Nature of the Pt-Cobalt-Oxide surface interaction and its role in the CO<sub>2</sub> Methanation (2022) 571

<https://doi.org/10.1016/j.apsusc.2021.151326>

19 Rajkumar, T., Sápi, A., Ábel, M., Kiss, J., Szenti, I., Baán, K., Gómez-Pérez, J.F., Kukovecz, Á., Kónya, Z. Surface Engineering of CeO<sub>2</sub> Catalysts: Differences Between Solid Solution Based and Interfacially Designed Ce<sub>1-x</sub>M<sub>x</sub>O<sub>2</sub> and MO/CeO<sub>2</sub> (M = Zn, Mn) in CO<sub>2</sub> Hydrogenation Reaction, (2021) 151 (12), pp. 3477-3491.

[DOI:10.1007/s10562-021-03591-y](https://doi.org/10.1007/s10562-021-03591-y)

20 Chawla, H., Saha, M., Upadhyay, S., Rohilla, J., Ingole, P.P., Sapi, A., Szenti, I., Yadav, M., Lebedev, V.T., Chandra, A., Garg, S. Enhanced photocatalytic activity and easy recovery of visible light active MoSe<sub>2</sub>/BiVO<sub>4</sub> heterojunction immobilized on: Luffa cylindrica -experimental and DFT study, (2021) 8 (10), pp. 3028-3041.

<https://doi.org/10.1039/D1EN00578B>

21 Tatar, D., Kojčinović, J., Marković, B., Széchenyi, A., Miletić, A., Nagy, S.B., Ziegenheim, S., Szenti, I., Sapi, A., Kukovecz, Á., Dinjar, K., Tang, Y., Stenzel, D., Varga, G., Djerdj, I. Sol-gel synthesis of ceria-zirconia-based high-entropy oxides as high-promotion catalysts for the synthesis of 1,2-diketones from aldehyde (2021) 26 (20)

<https://doi.org/10.3390/molecules26206115>

22 Sebők, D., Vásárhelyi, L., Szenti, I., Vajtai, R., Kónya, Z., Kukovecz, Á. Fast and accurate lacunarity calculation for large 3D micro-CT datasets, (2021) 214,

<https://doi.org/10.1016/j.actamat.2021.116970>

23 Pálvölgyi, P.S., Sebők, D., Szenti, I., Bozo, E., Ervasti, H., Pitkänen, O., Hannu, J., Jantunen, H., Leinonen, M.E., Myllymäki, S., Kukovecz, A., Kordas, K. Lightweight porous silica foams with extreme-low dielectric permittivity and loss for future 6G wireless communication technologies, (2021) 14 (5), pp. 1450-1456.

[DOI:10.1007/s12274-020-3201-2](https://doi.org/10.1007/s12274-020-3201-2)

24 Efremova, A., Rajkumar, T., Szamosvölgyi, A., Sápi, A., Baán, K., Szenti, I., Gómez-Pérez, J., Varga, G., Kiss, J., Halasi, G., Kukovecz, A., Kónya, Z.

Complexity of a Co<sub>3</sub>O<sub>4</sub> System under Ambient-Pressure CO<sub>2</sub> Methanation: Influence of Bulk and Surface Properties on the Catalytic Performance, (2021) 125 (13), pp. 7130-7141.

<https://doi.org/10.1021/acs.jpcc.0c09717>

25 Ballai, G., Gyenes, T., Haspel, H., Vásárhelyi, L., Szenti, I., Sebők, D., Kónya, Z., Kukovecz, Á. Binder-free construction of a methanol tolerant pt/tio2/carbon paper anode by atomic layer deposition (2021) 11 (2), pp. 1-10.

<https://doi.org/10.3390/catal11020154>

26 Pitkänen, O., Eraslan, T., Sebok, D., Szenti, I., Kukovecz, Á., Vajtai, R., Kordas, K. Flexible planar supercapacitors by straightforward filtration and laser processing steps (2020) 31 (49)

[DOI:10.1088/1361-6528/abb336](https://doi.org/10.1088/1361-6528/abb336)

27 Le, G.H., Nguyen, T.T., Nguyen, M.B., Quan, T.T.T., Nguyen, T.D., Sapi, A., Szenti, I., Mutyala, S., Kukovecz, A., Konya, Z., Vu, T.A. Cu-Fe Incorporated Graphene-Oxide Nanocomposite as Highly Efficient Catalyst in the Degradation of Dichlorodiphenyltrichloroethane (DDT) from Aqueous Solution, (2020) 63 (11-14), pp. 1314-1324.

[DOI:10.1007/s11244-020-01273-4](https://doi.org/10.1007/s11244-020-01273-4)

28 Grubeša, I.N., Vračević, M., Ducman, V., Marković, B., Szenti, I., Kukovecz, A. Influence of the size and type of pores on brick resistance to freeze-thaw cycles, (2020) 13 (17)

<https://doi.org/10.3390/ma13173717>

29 Pham, S.T., Nguyen, B.M., Le, G.H., Sapi, A., Mutyala, S., Szenti, I., Konya, Z., Vu, T.A. Role of Brønsted and Lewis acidic sites in sulfonated Zr-MCM-41 for the catalytic reaction of cellulose into 5-hydroxymethyl furfural (2020) 130 (2), pp. 825-836.

[DOI:10.1007/s11144-020-01799-4](https://doi.org/10.1007/s11144-020-01799-4)

30 Varga, G., Sági, A., Varga, T., Baán, K., Szenti, I., Halasi, G., Mucsi, R., Óvári, L., Kiss, J., Fogarassy, Z., Pécz, B., Kukovecz, Á., Kónya, Z. Ambient pressure CO<sub>2</sub> hydrogenation over a cobalt/manganese-oxide nanostructured interface: A combined in situ and ex situ study, (2020) 386, pp. 70-80.

<https://doi.org/10.1016/j.jcat.2020.03.028>

31 Mérai, L., Rajkumar, T., Janovák, L., Sági, A., Szenti, I., Nagy, L., Molnár, T., Bíró, I., Sárosi, J., Kukovecz, Á., Kónya, Z. Sulfur nanoparticles transform montmorillonite into an inorganic surfactant applicable in thermoplastics processing, (2020) 85

<https://doi.org/10.1016/j.polymeresting.2020.106419>

32 Mérai, L., Janovák, L., Kovács, D.S., Szenti, I., Vásárhelyi, L., Kukovecz, Á., Dékány, I., Kónya, Z., Sebők, D. Fast optical method for characterizing plasmonic nanoparticle adhesion on functionalized surfaces (2020) 412 (14), pp. 3395-3404.

<https://doi.org/10.1007/s00216-019-02307-x>

33 Nagy, K.A., Tóth, I.Y., Ballai, G., Varga, Á.T., Szenti, I., Sebők, D., Kopniczky, J., Hopp, B., Kukovecz, Á. Wetting and evaporation on a carbon cloth type gas diffusion layer for passive direct alcohol fuel cells, (2020) 304

<https://doi.org/10.1016/j.molliq.2020.112698>

34 Shukla, S., Kumar, V., Kameswara Rao, P.V., Sharma, S., Sebők, D., Szenti, I., Rawal, A., Kukovecz, A. Probing the three-dimensional porous and tortuous nature of absorptive glass mat (AGM) separators, (2020) 27

<https://doi.org/10.1016/j.est.2019.101003>

35 Bálint, A.R., Puskás, T., Menyhárt, Á., Kozák, G., Szenti, I., Kónya, Z., Marek, T., Bari, F., Farkas, E. Aging Impairs Cerebrovascular Reactivity at Preserved Resting Cerebral Arteriolar Tone and Vascular Density in the Laboratory Rat (2019) 11

<https://doi.org/10.3389/fnagi.2019.00301>

36 Grubeša, I.N., Markovic, B., Vracevic, M., Tunkiewicz, M., Szenti, I., Kukovecz, A. Pore structure as a response to the freeze/thaw resistance of mortars, (2019) 12 (19)

<https://doi.org/10.3390/ma12193196>

- 37 Ranjous, Y., Regdon, G., Jr., Pintye-Hódi, K., Varga, T., Szent, I., Kónya, Z., Sovány, T. Optimization of the production process and product quality of titanate nanotube–drug composites (2019) 9 (10)  
<https://doi.org/10.3390/nano9101406>
- 38 Sági, A., Rajkumar, T., Ábel, M., Efremova, A., Grósz, A., Gyuris, A., Ábrahám, K.B., Szent, I., Kiss, J., Varga, T., Kukovecz, Á., Kónya, Z. Noble-metal-free and Pt nanoparticles-loaded, mesoporous oxides as efficient catalysts for CO<sub>2</sub> hydrogenation and dry reforming with methane(2019) 32, pp. 106-118.  
<https://doi.org/10.1016/j.jcou.2019.04.004>
- 39 Sági, A., Kashaboina, U., Ábrahám, K.B., Gómez-Pérez, J.F., Szent, I., Halasi, G., Kiss, J., Nagy, B., Varga, T., Kukovecz, Á., Kónya, Z. Synergetic of Pt nanoparticles and h-zsm-5 zeolites for efficient CO<sub>2</sub> activation: Role of interfacial sites in high activity, (2019) 6  
<https://doi.org/10.3389/fmats.2019.00127>
- 40 Pitkänen, O., Tolvanen, J., Szent, I., Kukovecz, Á., Hannu, J., Jantunen, H., Kordas, K. Lightweight Hierarchical Carbon Nanocomposites with Highly Efficient and Tunable Electromagnetic Interference Shielding Properties, (2019) 11 (21), pp. 19331-19338.  
<https://doi.org/10.1021/acsami.9b02309>
- 41 Mérai, L., Varga, N., Deák, Á., Sebők, D., Szent, I., Kukovecz, Á., Kónya, Z., Dékány, I., Janovák, L. Preparation of photocatalytic thin films with composition dependent wetting properties and self-healing ability, (2019) 328, pp. 85-90.  
<https://doi.org/10.1016/j.cattod.2018.10.015>
- 42 Rawal, A., Rao, P.V.K., Kumar, V., Sharma, S., Shukla, S., Sebők, D., Szent, I., Kukovecz, A. Optimal design of absorptive glass mat (AGM) separator with fastest electrolyte uptake using X-ray micro-computed tomography, (2019) 21, pp. 505-509.  
<https://doi.org/10.1016/j.est.2018.11.026>
- 43 Szent, I., Bugyi, L., Kónya, Z. Reaction and Diffusion Paths of Water and Hydrogen on Rh Covered Black Titania (2018) 61 (12-13), pp. 1362-1374.  
[DOI:10.1007/s11244-018-0990-6](https://doi.org/10.1007/s11244-018-0990-6)
- 44 Drost, M., Tu, F., Vollnhals, F., Szent, I., Kiss, J., Marbach, H. On the Principles of Tweaking Nanostructure Fabrication via Focused Electron Beam Induced Processing Combined with Catalytic Growth Processes (2017) 1 (6)  
<https://doi.org/10.1002/smt.201700095>
- 45 Szent, I., Bugyi, L., Kónya, Z. The promotion of CO dissociation by molybdenum oxide overlayers on rhodium, (2017) 657, pp. 1-9.  
<https://doi.org/10.1016/j.susc.2016.11.002>
- 46 Tu, F., Drost, M., Szent, I., Kiss, J., Kónya, Z., Marbach, H. Localized growth of carbon nanotubes via lithographic fabrication of metallic deposits, (2017) 8 (1), pp. 2592-2605.  
<https://doi.org/10.3762/bjnano.8.260>
- 47 Szent, I., Bugyi, L., Kónya, Z. Enhanced dispersion and the reactivity of atomically thin Rh layers supported by molybdenum oxide films (2015) 641, pp. 60-67.  
<https://doi.org/10.1016/j.susc.2015.05.008>
- 48 Bugyi, L., Szent, I., Kónya, Z. Promotion and inhibition effects of TiO<sub>x</sub> species on Rh inverse model catalysts, (2014) 313, pp. 432-439  
<https://doi.org/10.1016/j.apsusc.2014.05.227>
- 49 Madarász, D., Szent, I., Sági, A., Halász, J., Kukovecz, Á., Kónya, Z. Exploiting the ion-exchange ability of titanate nanotubes in a model water softening process, (2014) 591, pp. 161-165.  
<https://doi.org/10.1016/j.cplett.2013.11.021>
- 50 Berkó, A., Gubó, R., Óvári, L., Bugyi, L., Szent, I., Kónya, Z. Interaction of Rh with Rh nanoparticles encapsulated by ordered ultrathin TiO<sub>1+x</sub> film on TiO<sub>2</sub>(110) surface, (2013) 29 (51), pp. 15868-15877.  
<https://doi.org/10.1021/la4038292>

51 Madarász, D., Szent, I., Nagy, L., Sápi, A., Kukovecz, A., Kónya, Z. Fine tuning the surface acidity of titanate nanostructures (2013) 19 (2-4), pp. 695-700.

**DOI:**[10.1007/s10450-013-9494-7](https://doi.org/10.1007/s10450-013-9494-7)