

## Sandugash KALYBEKKYZY

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### PROFESSIONAL PROFILE

A dedicated and experienced leading researcher and PI on several projects. Adept at working and training students for conducting experiments, doing research, and writing original papers. Current research interests include Polymer chemistry, Nanomaterial synthesis and application, Polymer electrolytes for Li-ion batteries, Organic-inorganic hybrid materials (membranes and separators), Polymerization techniques, MOS synthesis and application. H-index = 7.

### WORK EXPERIENCE

<b>2020 – present</b>	Senior Researcher, National Laboratory Astana, Nazarbayev University, Kazakhstan
<b>2018-2020</b>	Researcher, National Laboratory Astana, Nazarbayev University, Kazakhstan
<b>2015-2018</b>	Research Assistant, Marmara University, Turkey
<b>2014-2015</b>	Visiting Research Assistant, Gazi University, Turkey
<b>2013-2014</b>	Research Assistant, Al-Farabi Kazakh National University, Kazakhstan

### EDUCATION

<b>2015 - 2020</b>	<b>Ph.D. in Chemistry</b> , Organic Chemistry Programme, Marmara University, Istanbul, Turkey <b>Thesis Title:</b> “Development of Polymer Materials for Flexible Lithium-ion Batteries”, Thesis Advisor: Memet Vezir Kahraman
<b>2013 - 2015</b>	<b>M.Sc. in Chemistry</b> , Theoretical and Applied Chemistry Program, Al-Farabi Kazakh National University, Almaty, Kazakhstan <b>Thesis Title:</b> “Soft Mechanochemical Synthesis of Series of Phosphates”, Thesis Advisor: Galina Kuanysheva
<b>2008 - 2013</b>	<b>B.Sc. in Chemistry Education</b> , Marmara University, Istanbul, Turkey

### RESEARCH PROJECTS and GRANTS

- Synthesis of Ultrathin Composite Solid Polymer Electrolyte with Improved Characteristics for Lithium-Ion Batteries, Research Grant, Funded by MES RK, **2022-2024, Project PI.**
- Development of Flexible and Safe Next-Generation Li-Ion Batteries, Research Grant, Funded by MES RK, **2020-2022, Project PI.**
- Development of Highly Sensitive MOS-based Nano-film Gas Sensors, Collaborative Research Project Grant from Nazarbayev University, **2021-2023, Project Co-PI.**
- High Performance Polymer-based Anion Exchange Membranes for Alkaline Fuel Cells, Funded by MES RK, **2021-2023, Project Co-PI.**
- New materials and devices for defense and aerospace applications, State Targeted Program from MDDIAI Republic of Kazakhstan, **2021-2023, Sub-program Co-PI.**
- Development of Composite Anion Exchange Membranes with Improved Chemical and Mechanical stability. FDCRGP grant funded by Nazarbayev University, **2020-2022, Senior Researcher.**
- Innovative Materials and Systems for Energy Conversion and Storage, State Targeted Program, Funded by MES RK, **2018-2020, Researcher.**

- Development of Safe and High Performance Flexible Li-ion Batteries, Research Grant from Nazarbayev University, **2019-2022, Researcher.**

## PUBLICATIONS

1. Sultanov, F., Mentbayeva, A., **Kalybekkyzy, S.**, Zhaisanova, A., Myung, S.-T., Bakenov, Z. Advances of graphene-based aerogels and their modifications in lithium-sulfur batteries (2023) Carbon, 201, pp. 679-702, **Q1**, DOI: 10.1016/j.carbon.2022.09.069
2. Yerkinbekova, Y., **Kalybekkyzy, S.\***, Tolganbek, N., Kahraman, M.V., Bakenov, Z., Mentbayeva\*, A. Photo-crosslinked lignin/PAN electrospun separator for safe lithium-ion batteries (2022) Scientific Reports, 12 (1), № 18272, **Q1**, DOI: 10.1038/s41598-022-23038-7
3. Yergaliuly, G., Soltabayev, B., **Kalybekkyzy, S.**, Bakenov, Z., Mentbayeva, A. Effect of thickness and reaction media on properties of ZnO thin films by SILAR (2022) Scientific Reports, 12 (1), № 851, **Q1**, DOI: 10.1038/s41598-022-04782
4. Karibayev, M., **Kalybekkyzy, S.**, Wang, Y., Mentbayeva, A. Molecular Modeling in Anion Exchange Membrane Research: A Brief Review of Recent Applications (2022) Molecules, **Q2**, 27 (11), № 3574, DOI: 10.3390/molecules27113574
5. Rakhmanova, A., **Kalybekkyzy, S.\***, Soltabayev, B., Bissenbay, A., Kassenova, N., Bakenov, Z., Mentbayeva, A. Application of Response Surface Methodology for Optimization of Nanosized Zinc Oxide Synthesis Conditions by Electrospinning Technique (2022) Nanomaterials, 12 (10), № 1733, **Q1**, DOI: 10.3390/nano12101733
6. Karibayev, M., Myrzakhmetov, B., **Kalybekkyzy, S.**, Wang, Y., Mentbayeva, A. Binding and Degradation Reaction of Hydroxide Ions with Several Quaternary Ammonium Head Groups of Anion Exchange Membranes Investigated by the DFT Method (2022) Molecules, 27 (9), № 2686, **Q2**, DOI: 10.3390/molecules27092686
7. Tolganbek, N., Serikkazyeva, A., **Kalybekkyzy, S.**, Sarsembina, M., Kanamura, K., Bakenov, Z., Mentbayeva, A. Interface modification of NASICON-type Li-ion conducting ceramic electrolytes: a critical evaluation (2022) Materials Advances, 3 (7), pp. 3055-3069, **Q2**, DOI: 10.1039/d1ma01239h
8. Kassenova, N., **Kalybekkyzy, S.\***, Kahraman, M.V., Mentbayeva, A., Bakenov, Z. Photo and thermal crosslinked poly(vinyl alcohol)-based nanofiber membrane for flexible gel polymer electrolyte (2022) Journal of Power Sources, 520, № 230896, **Q1**, DOI: 10.1016/j.jpowsour.2021.230896
9. Pavlenko, V., **Kalybekkyzy, S.**, Knez, D., Abbas, Q., Mansurov, Z., Bakenov, Z., Ng, A. Revisiting the carbon mesopore contribution towards improved performance of ionic liquid-based EDLCs at sub-zero temperatures (2022) Ionics, 28 (2), pp. 893-901. DOI: 10.1007/s11581-021-04354-w
10. Tolganbek, N., Yerkinbekova, Y., **Kalybekkyzy, S.**, Bakenov, Z., Mentbayeva, A. Current state of high voltage olivine structured LiMPO<sub>4</sub> cathode materials for energy storage applications: A review (2021) Journal of Alloys and Compounds, 882, № 160774, **Q1**, DOI: 10.1016/j.jallcom.2021.160774
11. **Kalybekkyzy, S.**, Kopzhassar, A.-F., Kahraman, M.V., Mentbayeva, A., Bakenov, Z. Fabrication of uv-crosslinked flexible solid polymer electrolyte with pdms for li-ion batteries (2021) Polymers, 23 (1), № 15, pp. 1-12, **Q1**, DOI: 10.3390/polym13010015
12. Baikalov, N., Serik, N., **Kalybekkyzy, S.**, Kurmanbayeva, I., Bakenov, Z., Mentbayeva, A. High Mass-Loading Sulfur-Composite Cathode for Lithium-Sulfur Batteries (2020) Frontiers in Energy Research, 8, № 207, **Q2**, DOI: 10.3389/fenrg.2020.00207
13. **Kalybekkyzy, S.**, Mentbayeva, A., Yerkinbekova, Y., Baikalov, N., Kahraman, M.V., Bakenov, Z. Electrospun 3D structured carbon current collector for Li/S batteries (2020) Nanomaterials, 10 (4), № 745, **Q1**, DOI: 10.3390/nano10040745

14. **Kalybekkyzy, S.**, Mentbayeva, A., Vezir Kahraman, M., Zhang, Y., Bakenov, Z. Flexible S/DpAN/KB nanofiber composite as binder-free cathodes for Li-S batteries (2019) Journal of the Electrochemical Society, 166 (3), pp. A5396-A5402, **Q1**, DOI: 10.1149/2.0571903jes

## HONORS & AWARDS

- Turkey Scholarship for Graduate Studies, Istanbul, Turkey (2015 – 2020)
- Mevlana Exchange Programme Scholarship (September 2014 – August 2015)
- Graduate Program Stipend of Ministry of Education of Kazakhstan (2013 – 2015)
- Turkey Scholarship for Undergraduate Studies (2008 – 2013)

## PROFESSIONAL ACTIVITIES

— Supervised Diploma Works of Undergraduate and Graduate Students:

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|--------------------|---|
| <b>2019 – 2021</b> | Yerkezhan Yerkinbekova “Functionalized nanofibrous membranes for energy storage materials”, Master Programme, Nazarbayev University, Nur-Sultan, Kazakhstan   |
| <b>2019 – 2020</b> | Zhamal Yermekbay “Polymer Membranes for Gel Electrolytes by Electrospinning method”, Bachelor Programme, Eurasian National University, Nur-Sultan, Kazakhstan   |
| <b>2018 – 2019</b> | Yerkezhan Yerkinbekova “Sulfur-containing Composite Cathode Materials for Li-ion Batteries”, Bachelor Programme, Eurasian National University, Nur-Sultan, Kazakhstan                                   |
| <b>2018 – 2019</b> | Al-Farabi Kopzhassar “Solid Polymer Electrolyte for Li-ion Batteries”, Bachelor Programme, Toraihyrov University, Pavlodar, Kazakhstan  |
| <b>2013– 2015</b>  | Aidana Botambay “Synthesis of $M_2(II)P_2O_7$ Polyphosphates, where $M(II) = Zn, Mn, Ni$ by Soft Mechanochemical Synthesis”, Bachelor Program, Al-Farabi Kazakh National University, Almaty, Kazakhstan |

— Successfully completed certificate program for researchers “**Education on Animal Use for Researchers**” Marmara University