Dr. ANJAN BANERJEE

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Personal Information

Date of Birth: 24 October 1984
Nationality: Indian
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Professional Experience

- Assistant Professor – Department of Chemistry, Presidency University, Kolkata, India from 03 October 2018 to present
  Research Area: *Materials Electrochemustry and Energy Storage Systems*
  Teaching Area: *Inorganic and Materials Chemistry (Under and Post Graduate)*

- Sr. Manager – Design (Electrochemistry) in Godrej-UEP Project at Godrej and Boyce Mfg. Co. Ltd., India from 10 September 2018 to 29 September 2018
  Research Area: *MnO_2/Zn Secondary Batteries*

- Scientist – Materials R&D in Lead-Carbon Project at Livguard Energy Technologies Pvt. Ltd., India from 04 April 2017 to 10 August 2018
  Research Area: *Carbonaceous Materials in Lead-Acid Batteries*

- Post-Doctoral Research Fellow – Department of Chemistry, Bar-Ilan University, Israel with Prof. D. Aurbach from 01 February 2015 to 20 March 2017
  Research Areas: *Li-Ion and Lead-Acid Batteries*

- Research Associate – Solid State and Structural Chemistry Unit (SSCU), Indian Institute of Science, India with Prof. A. K. Shukla from 25 June 2014 to 13 January 2015
  Research Areas: *Asymmetric/Hybrid Supercapacitors and Flow Batteries*

- Research Fellow (PhD) – Solid State and Structural Chemistry Unit (SSCU), Indian Institute of Science, India with Prof. A. K. Shukla from 03 August 2009 to 24 June 2014
  Research Areas: *Lead-Carbon Hybrid Ultracapacitors*

Research Projects

1. Aqueous Energy Storage Devices by Coupling of Na-Ion Battery and Pseudocapacitor for Photovoltaic Applications
   Funding Agency: University Grants Commission (UGC), India
   Sanction Order No.: F.30-509/2020(BSR), dated 31.01.2020
   Sanctioned Amount: 10,00,000 INR
   Duration: 3 Years
   Status: Ongoing

2. Aqueous Na-Ion Batteries with Organic Anodes for Load-Leveling Applications
   Funding Agency: Science and Engineering Research Board (SERB), India
   Sanction Order No.: SRG/2019/000296, dated 24.10.2019
   Sanctioned Amount: 24,94,000 INR
   Duration: 2 Years
   Status: Completed

Patent

1. Aqueous Energy Storage Device, **A. Banerjee**, P. Naskar, S. Debnath and A. Maiti, Indian Patent Application No: 202231010840; filed on 28.02.2022.

2. Acid-Scavenging Functional Separators for Power Performance of Lithium Ion Electrochemical Cells, S. Luski, D. Aurbach, T. J. Fuller, I. C. Halalay, **A. Banerjee**, B. Ziv and K. Raghunathan, US Patent Grant No: US 10741812 B2; dated 11.08.2020.

3. Lithium Ion Battery, S. Luski, D. Aurbach, I. C. Halalay, T. J. Fuller, B. R. Powell Jr, **A. Banerjee**, Y. Shilina and B. Ziv, US Patent Grant No: US 10008749 B2; dated 26.06.2018.

4. Lithium Ion Battery, S. Luski, D. Aurbach, B. R. Powell Jr, I. C. Halalay, T. J. Fuller, **A. Banerjee**, Y. Shilina and B. Ziv, US Patent Grant No: US 10050313 B2; dated 14.08.2018.

5. Novel Bipolar Plate for use in Redox Flow Batteries, A. K. Shukla and **A. Banerjee**, Indian Patent Grant No: 332130; dated 17.02.2020.

6. Cost Effective Energy Storage Device and Methods Thereof, A. K. Shukla and **A. Banerjee**, Indian Patent Grant No: 348562; dated 05.10.2020.

7. An Energy Storage Device, an Inorganic Gelled Electrolyte and Methods Thereof, A. K. Shukla, **A. Banerjee**, M. K. Ravikumar and S. A. Gaffoor, Indian Patent Grant No: 313903; dated 10.06.2019; US Patent Grant No: US9036332 B2; dated 19.05.2015.

Book Chapter

1. Lead-Carbon Hybrid Ultracapacitors and their Applications (Chapter 8), A. K. Shukla, **A. Banerjee**, and M. K. Ravikumar, in "*Electrochemically Enabled Sustainability: Devices, Materials, and Mechanisms for Energy Conversion"*, K. Y. Chan, C. Y. V. Li, editor(s), CRC Press, Taylor & Francis Group, ISBN 9781466575431 (2014).

Publications in Journals

1. Low-Cost and Scalable Ni-Prussian Blue Analogue//Functionalized Carbon based Na-Ion Systems for all Climate Operations, P. Naskar, S. Debnath, A. Maiti, B. Biswas, and **A. Banerjee***, *ChemPhysChem*, **24** (2023) e202300051 (***Cover page***).

2. Lithium Ion Batteries: Indispensable Assets for "Rechargeable World", P. Naskar, S. Debnath, N. Mukherjee, and **A. Banerjee***, *Resonance: Journal of Science Education*, **28** (2023) 577.

3. Rechargeable Manganese Dioxide−Zinc Batteries: A Review Focusing on Challenges and Optimization Strategies under Alkaline and Mild Acidic Electrolyte Media, S. Debnath, A. Maiti, P. Naskar, **A. Banerjee***, *ChemNanoMat*, **8** (2022) e202200261.

4. Frontiers in Hybrid Ion Capacitors: A Review on Advanced Materials and Emerging Devices, P. Naskar, D. Kundu, A. Maiti, P. Chakraborty, B. Biswas, and **A. Banerjee***, *ChemElectroChem*, **8** (2021) 1393 (***Cover page***).

5. Chemical Supercapacitors: A Review Focusing on Metallic Compounds and Conducting Polymers, P. Naskar, A. Maiti, P. Chakraborty, D. Kundu, B. Biswas and **A. Banerjee***, *J. Mater. Chem. A*, **9** (2021), 1970.

6. Envisaging Future Energy Storage Materials for Supercapacitors: An Ensemble of Preliminary Attempts, P. Naskar, P. Chakraborty, D. Kundu, A. Maiti, B. Biswas, and **A. Banerjee***, *ChemistrySelect*, **6** (2021) 1127.

7. LNMO-graphite cells performance enhancement by the use of acid scavenging separators, Y. Shilina, S. Maddukuri, **A. Banerjee**, B. Ziv, S. Luski, D. Aurbach and I. C. Halalay, *ChemElectroChem*, **6** (2019) 3690.

8. Multifunctional Separators: A Promising Approach for Improving the Durability and Performance of Li-Ion Batteries, **A. Banerjee**, B. Ziv, Y. Shilina, J. M. Ziegelbauer, H. Liu, K. J. Harris, G. Botton, G. R. Goward, S. Luski, D. Aurbach and I. C. Halalay, *J. Electrochem. Soc*., **166** (2019) A5369.

9. The Effectiveness of Multifunctional Li-Ion Battery Separators Past Their Saturation with Transition Metal Ions, **A. Banerjee**, B. Ziv, S. Luski, D. Aurbach and I. C. Halalay, *J. Electrochem. Soc*., **165** (2018) A2096 (***Editor's Choice***).

10. Elucidating the Li-Ion Battery Performance Benefits Enabled by Multifunctional Separators, H. Liu, **A. Banerjee**, B. Ziv, K. J. Harris, N. P. W. Pieczonka, S. Luski, G. A. Botton, G. R. Goward, D. Aurbach and I. C. Halalay, *ACS Appl. Energy Mater*., **1** (2018) 1878.

11. Acid-Scavenging Separators: A Novel Route for Improving the Li-Ion Batteries' Durability, **A. Banerjee**, B. Ziv, Y. Shilina, S. Luski, D. Aurbach and I. C. Halalay, *ACS Energy Lett*., **2** (2017) 2388.

12. On the Oxidation State of Manganese Ions in Li-Ion Battery Electrolyte Solutions, **A. Banerjee**, Y. Shilina, B. Ziv, J. M. Ziegelbaure, S. Luski, D. Aurbach and I. C. Halalay, *J. Am. Chem. Soc*., **139** (2017) 1738.

13. Single-Wall Carbon Nanotube Doping in Lead-Acid Batteries: A New Horizon, **A. Banerjee**, B. Ziv, Y. Shilina, E. Levi, S. Luski and D. Aurbach, *ACS Appl. Mater. Interfaces*, **9** (2017) 3634.

14. Multifunctional Materials for Enhanced Li-Ion Batteries Durability: A Brief Review of Practical Options, **A. Banerjee**, Y. Shilina, B. Ziv, J. M. Ziegelbaure, S. Luski, D. Aurbach and I. C. Halalay, *J. Electrochem. Soc*., **164** (2017) A6315.

15. Increasing the Durability of Li-Ion Batteries by Means of Manganese Ion Trapping Materials with Nitrogen Functionalities, **A. Banerjee**, B. Ziv, S. Luski, D. Aurbach and I. C. Halalay, *J. Power Sources*, **341** (2017) 457.

16. Multifunctional Manganese Ions Trapping and Hydrofluoric Acid Scavenging Separator for Lithium Ion Batteries Based on poly(ethylene-*alternate*-maleic acid) dilithium salt, **A. Banerjee**, B. Ziv, Y. Shilina, S. Luski, I. C. Halalay and D. Aurbach, *Adv. Energy Mater.*, **7** (2017) 1601556.

17. Single-wall Carbon Nanotubes Embedded in Active Masses for High-Performance Lead-Acid Batteries, **A. Banerjee***, B. Ziv, E. Levi, Y. Shilina, S. Luski and D. Aurbach, *J. Electrochem. Soc*., **163** (2016) A1518.

18. Improving Stability of Li-Ion Batteries by Means of Transition Metal Ions Trapping Separators, **A. Banerjee***, B. Ziv, Y. Shilina, S. Luski, D. Aurbach and I. C. Halalay, *J. Electrochem. Soc*., **163** (2016) A1083.

19. Combined Electron Paramagnetic Resonance and Atomic Absorption Spectroscopy/Inductively Coupled Plasma Analysis as Diagnostics for Soluble Manganese Species from Mn-Based Positive Electrode Materials in Li-Ion Cells, Y. Shilina, B. Ziv, A. Meir, **A. Banerjee**, S. Ruthstein, S. Luski, D. Aurbach and I. C. Halalay, *Anal. Chem*., **88** (2016) 4440.

20. 1 V Supercapacitor Device with Nanostructured Graphene Oxide/Polyaniline Composite Materials, D. Kumar, **A. Banerjee***, S. Patil and A. K. Shukla, *Bull. Mater. Sci*., **38** (2015) 1507.

21. Enhanced Performance of Starter Lighting IgnitionType Lead-Acid Cells with Carbon Nanotubes as an Additive to the Active Mass, R.Marom, B.Ziv, **A. Banerjee**, B. Cahana, S. Luski and D. Aurbach, *J. Power Sources*, **296** (2015) 78.

22. Studies on 12 V Substrate-Integrated Lead-Carbon Hybrid Ultracapacitors, **A. Banerjee** and A. K. Shukla, *J. Chem. Sci*.,**127** (2015) 967.

23. A Photovoltaic Stand-alone Lighting System with Polymeric-Silica-Gel-Electrolyte-Based Substrate-Integrated Lead-Carbon Hybrid Ultracapacitors, **A. Banerjee**, S. K. Ramasesha and A. K. Shukla, *Electrochem. Energy Technol*., **1** (2015) 10.

24. Series Connected Substrate-Integrated Lead-Carbon Hybrid Ultracapacitors with Voltage-Management Circuit, **A. Banerjee***, R. Srinivasan and A. K. Shukla, *Bull. Mater. Sci*., **38** (2015) 129.

25. Performance Comparison for 12 V Lead-Carbon Hybrid Ultracapacitors with Substrate-Integrated and Conventional Pasted-Positive Plates, **A. Banerjee** and A. K. Shukla, *Ionics*, **21** (2015) 201.

26. Design of Substrate-Integrated Lead-Carbon Hybrid Ultracapacitor and Experimental Validation, **A. Banerjee**, R. Srinivasan and A. K. Shukla, *ECS Electrochem. Lett.*, **3** (2014) A1.

27. Influence of Binder Solvents on Carbon-Layer Structure in Electrical-Double-Layer Capacitors, **A. Banerjee**, P. Suresh Kumar and A. K. Shukla, *J. Chem. Sci*., **125** (2013) 1177.

28. 12 V / kilo-Farad Range Lead-Carbon Hybrid Ultracapacitors and Their Envisaged Applications, A. K. Shukla, **A. Banerjee**, A. Jalajakshi and M. K. Ravikumar, *ECS Trans*., **50** (2013) 367.

29. A Soluble-Lead Redox Flow Battery with Corrugated Graphite Sheet and Reticulated Vitreous Carbon as Positive and Negative Current Collectors, **A. Banerjee**, D. Saha, T. N. Guru Row and A. K. Shukla, *Bull. Mater. Sci*., **36** (2013) 163.

30. Electrochemical Capacitors: Technical Challenges and Prognosis for Future Markets, A. K. Shukla, **A. Banerjee**, M. K. Ravikumar and A. Jalajakshi, *Electrochim. Acta*, **84** (2012) 165.

31. A 12 V Substrate-Integrated PbO_2-Activated Carbon Asymmetric Hybrid Ultracapacitor with Silica-Gel-Based Inorganic-Polymer Electrolyte, **A. Banerjee**, M. K. Ravikumar, A. Jalajakshi, S. A. Gaffoor and A. K. Shukla, *ECS Trans*., **41** (2012) 101.

32. Substrate-Integrated Lead-Carbon Hybrid Ultracapacitor with Flooded, Absorbent-Glass-Mat and Silica-Gel Electrolyte Configurations, **A. Banerjee**, M. K. Ravikumar, A. Jalajakshi, P. Suresh Kumar, S. A. Gaffoor and A. K. Shukla, *J. Chem. Sci*., **124** (2012) 747 **(Cover Page)**.

33. Synthesis, characterization and catecholase-like activity of [Mn2L2(l1,5-dca)2(dca)2]_H2O [L5N,N0-ethylenebis(2-benzoylpyridineimine), dca 5 dicyanamide], P. Maiti, T. Ghosh, **A. Banerjee**, A. Banerjee, S. Bhattacharya, E. Suresh and D. Das, *Transition Met. Chem*., **36** (2011) 195.

34. Electrical-energy storage in hybrid ultracapacitors, M. K. Ravikumar, E. Niranjana, A. Sundar Rajan, **A. Banerjee**, S. A. Gaffor and A. K. Shukla, *J. Indian Inst. Sci.*, **89** (2009) 455.