

Technical Program SUPERBAT-2022

March 28 - 30, 2022

Organized by

Multifunctional Energy Materials Laboratory,

Department of Physics, IIT Kharagpur, West Bengal

Link to join the conference:

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Meeting ID: 588 490 9082

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Program Overview

Day 1: March 28, 2022

09:45-10:00	Inauguration Session
09:45-09:50	<i>Welcome speech by Prof. Amreesh Chandra (Convenor)</i>
09:50-09:55	<i>Opening Remarks by Prof. Prasanta Kumar Datta, Head of the Department</i>
09:55-10:00	<i>Vote of thanks by Prof. Trilok Singh (Secretary)</i>
Session-I (Novel Materials & Electrolytes)	
Session Chair: Prof. Amreesh Chandra	
10:00-10:35	<i>PT-1: Prof. Dr. A. K. Tyagi (Director, Chemistry Group, Bhabha Atomic Research Centre, India) Topic: <i>Anode Materials - From Bulk to Nanostructures</i></i>
10:35-11:10	<i>PT-2: Prof. Maria Forsyth (Deakin University, Australia) Topic: <i>Polymer electrolytes based on polymerisable ionic liquids (PILs) with enhanced ion dynamics</i></i>
11:10-11:30	High Tea
Session-II (Modelling and Simulation)	
Session Chair: Prof. Trilok Singh	
11:30-12:05	<i>PT-3: Prof. Ulrike Krewer (Institute for Applied Materials, Karlsruhe Institute of Technology, Germany) Topic: <i>Model-assisted design and analysis of Li-Ion batteries – From cradle to grave</i></i>

12:05-12:30	IT-1: Prof. Koushik Biswas (Metallurgical and Materials Engineering, IIT Kharagpur, India) Topic: <i>Li-Ion Battery (LIB) Materials Design guidelines and state-of-the-art</i>
12:30-12:55	IT-2: Dr. Fangfang Chen (Senior Research Fellow, Deakin University, Australia) Topic: <i>Understanding Ionic liquid electrolytes and interfaces for high energy density batteries</i>
12:55-13:05	O-1: Ms. Joyanti Halder (RS, Department of Physics, IIT Kharagpur, India) Topic: <i>Use of modified Fick's law in finding the role of modified diffusion behaviour of the electrolyte ions behind the improvement of supercapacitor electrode performance</i>
13:05-13:15	O-2: Mr. Abdul Ali (RS, Department of Energy Science and Engineering, IIT Bombay, India) Topic: <i>Model-based performance assessment of electrode parameters of a Vanadium Redox Flow Battery</i>
13:15-14:20	Lunch Break
Session-III (Supercapacitors - EDLC to Hybrid Devices)	
Session Chair: Prof. Amar Nath Gupta	
14:20-14:45	IT-3: Prof. Angel Perez (Tenured Scientist, ICMAB-CSIC, Institute of Materials Science of Barcelona, , Spain) Topic: <i>Fabrication of supercapacitor hybrid electrodes through advanced laser technologies</i>
14:45-15:10	IT-4: Prof. Chandramouli Subramaniam (Chemistry, IIT Bombay, India) Topic: <i>Understanding and manipulating the all-important electrode-electrolyte interface in solid-state supercapacitors</i>
15:10-15:20	O-3: Ms. Surbhi Singh (Prime Minister Research Fellow, School of Energy Science and Engineering, IIT Kharagpur) Topic: <i>Time dependent exfoliation of MoS₂ as cathode material for next generation hybrid supercapacitor</i>
15:20-15:30	O-4: Ms. Palak Mehra (RS, IISER Bhopal, India) Topic: <i>Deciphering the Incredible Supercapacitor Performance of Conducting Biordered Ultramicroporous Graphitic Carbon</i>
15:30-15:45	High Tea

Session-IV (Batteries – Li-ion and Beyond)	
Session Chair: Prof. Amita Chandra	
15:45-16:10	IT-5: Prof. Palani Balaya (FACerS, Department of Mechanical Engineering, National University of Singapore, Singapore) Topic: Developing Safe Na-ion Battery Technology
16:10-16:35	IT-6: Dr. Manjusha V. Shelke (Principal Scientist, Physical & Material's Chemistry Division, National Chemical Laboratory, Pune, India) Topic: <i>Batteries - Li-ion and beyond...</i>
16:35-17:00	IT-7: Prof. Saurabh S. Soni (Department of Chemistry, Sardar Patel University, Gujarat, India) Topic: <i>Amphiphilic Block Copolymer Induced Unique Features for Sustainable Smart Flexible Zinc-Ion Batteries</i>
17:00-17:15	IT-8: Dr. Dimple P. Dutta (Scientific Officer G, Chemistry Division. Bhabha Atomic Research Centre, Mumbai, India) Topic: <i>Nanostructured anode materials for sodium ion batteries</i>
17:15-17:50	Poster Session
17:15-17:17	P-1: Ms. Unmesha Ray (RS, IIT Kharagpur) Topic: <i>Effect of CTAB on Morphology and Electrochemical Performance of Nickel Antimony Oxide</i>
17:17-17:19	P-2: Ms. Joyanti Halder (RS, IIT Kharagpur) Topic: <i>Morphology dependent variation of the specific capacitance of NiO: Explanation using a simple theoretical model</i>
17:19-17:21	P-3: Ms. Indujalekshmi J (RS, Department of Physics, University of Kerala) Topic: <i>Contribution from insertion and surface processes: hybrid charge storage in hydrothermally reduced graphite oxide supercapacitors</i>
17:21-17:23	P-4: Ms. Surbhi Singh (PMRF, IIT Kharagpur) Topic: <i>Optimizing metal oxides-based anode material for high performance supercapacitor</i>
17:23-17:25	P-5: Ms. Mata Mani Tripathi (RS, Defence Materials and Stores Research and Development Establishment) Topic: <i>Nickel cobaltite coated NiSn layered double oxide/sulfide composites as advanced electrode for high-performance asymmetric supercapacitor</i>
17:25-17:27	P-6: Ms. Puja De (RS, Department of Physics, IIT Kharagpur) Topic: <i>Morphology dependent pseudo-capacitive properties of Na₂Ti₃O₇ for Na-ion supercapacitors</i>

17:27-17:29	P-7: Dr. Shruti Suriyakumar (Faculty, Indian Institute of Science Education and Research Thiruvananthapuram) Topic: <i>Titanium diboride-derived Nanosheets as Efficient Anode for Sodium-Ion Batteries</i>
17:29-17:31	P-8: Ms. Dipika Meghnani (RS, Department of Physics, Banaras Hindu University) Topic: <i>Electrochemical characterization of biphasic (O'3/O3) $\text{NaNi}_{0.815}\text{Co}_{0.15}\text{Al}_{0.035}\text{O}_2$ cathode materials synthesized via three different routes for sodium-ion batteries</i>
17:31-17:33	P-9: Ms. Honey Mittal (RS, Jamia Millia Islamia) Topic: <i>Optimization of MoSe_2 modified conducting polymer as electrode material for high supercapacitor performance</i>
17:33-17:35	P-10: Ms. Rajapriya A Topic: <i>Fabrication of WC/MoSe_2 2D hybrid nanostructure as an efficient electrode for high performance supercapacitor</i>
17:35-17:37	P-11: Ms. Arsha M S (RS, University of Kerala) Topic: <i>One step hydrothermal growth of partially reduced graphene oxide for binder free supercapacitors</i>
17:37-17:39	P-12: Ms. Priyanka Rani (RS, IIT Kharagpur) Topic: <i>Flexible solid-state supercapacitor based on ultrathin WS_2 nanosheets using ionic liquid electrolyte</i>
17:39-17:41	P-13: Dr. Monika Srivastava (RS, SMST, IIT Varanasi) Topic: <i>Green Synthesis of 2D-Activated Carbon for the Improved Super Capacitor Performance</i>
17:41-17:43	P-14: Ms. Sipra Mohapatra (RS, IIT Jodhpur) Topic: <i>Molecular Dynamics Study of Bovine Serum Albumin (BSA) Based Biocompatible Solid Polymer Electrolyte</i>
17:43-17:45	P-15: Ms. Sapta Sindhu Paul Chowdhury (RS, Indian Institute of Technology, Jodhpur) Topic: <i>Thermal Transport and the Interplay of In-plane and Out-of-plane Phonon Modes in Two-dimensional Layered Materials</i>

Day 2: March 29, 2022

Session-V (Materials Designing)	
Session Chair: Prof. Amreesh Chandra	
9:45-10:10	IT-9: Prof. Dr. Vinita Grover (Scientific Officer G, Chemistry Division, Bhabha Atomic Research Centre, Mumbai, India) Topic: <i>Role of structure in designing materials for superior energy storage applications</i>
10:10-10:35	IT-10: Prof. Neetu Jha (Department of Physics, Institute of Chemical Technology, Mumbai, India) Topic: <i>Development of Electrode Materials for Supercapacitor Device</i>
10:35-11:00	IT-11: Prof. M M Shaijumon (Department of Physics, IISER Thiruvananthapuram, India) Topic: <i>Engineered Carbon Materials for Hybrid Ion Capacitors</i>
11:00-11:10	O-5: Mr. Debabrata Mandal (RS, School of Nanoscience and Technology, IIT Kharagpur, India) Topic: <i>Pseudo 2-dimensional nanostructures of metal oxides for high-performance supercapacitors</i>
11:10-11:20	High Tea
Session-VI (Nanostructured Electrode Materials)	
Session Chair: Prof. P.S. Burada	
11:20-11:45	IT-12: Prof. Rajendra Kumar Singh (Department of Physics, Banaras Hindu University, India) Topic: <i>Surface modification strategies of cathode materials for improving the performance of sodium-ion batteries</i>
11:45-12:00	IT-13: Dr. Vikas Sharma (DST Inspire Faculty, Department of Sustainable Energy Engineering, IIT Kanpur, India) Topic: <i>Role of various components and parameters necessary for the commercialization of modern high- performance supercapacitors</i>
12:00-12:10	O-6: Mr. Tapas Das (RS, IIT Varanasi, India) Topic: <i>Facile synthesis of paratoluene sulfonic acid assisted S-doped polyaniline hybrid composite for energy storage devices</i>
12:10-12:20	O-7: Mr. Abhimanyu Kumar Prajapati (RS, Jaypee Institute of Information Technology, Noida, India) Topic: <i>MgH₂ catalyzed by graphene supported TiH₂ as anode for Lithium-ion batteries application</i>

12:20-12:30	O-8: Mr. Satvik Anshu (RS, School of Energy Science and Engineering, IIT Kharagpur, India) Topic: <i>High performing Au decorated metal oxide nanoparticles for supercapacitor's application</i>
12:30-13:00	SPONSOR (RIGAKU)
13:00-14:10	Lunch Break
Session-VII (Electrode Synthesis)	
Session Chair: Dr. Vinita Grover	
14:10-14:45	PT-4: Prof. Ajayan Vinu (Director & Global Innovation Chair Professor for Adv. Nanomater., University of Newcastle, Australia) Topic: <i>Functionalized Nanoporous Nanostructures for Energy and Environmental Applications</i>
14:45-15:10	IT-14: Prof. Georg Garnweitner (Head of Research Branch Nanomaterials, Technical University of Braunschweig) Topic: <i>Enhancement of Li-S batteries for aviation applications: from electrode stability to novel electrolytes</i>
15:10-15:20	O-9: Dr. Alok Kumar Rai (Assistant Professor, Department of Chemistry, University of Delhi, India) Topic: <i>Cobalt molybdate (CoMoO₄): a highly suitable anode material for rechargeable batteries: LIB vs. SIB</i>
15:20-15:30	O-10: Mr. Basudeba Maharana (RS, School of Basic Sciences, Indian Institute of Technology Bhubaneswar) Topic: <i>High charge-storage performance of morphologically modified anatase TiO₂: Experimental and theoretical insight</i>
15:30-15:45	High Tea
Session-VIII (Cathode Materials)	
Session Chair: Prof. Trilok Singh	
15:45-16:10	IT-15: Prof. Sushmee Badhulika (Department of Electrical Engineering, IIT Hyderabad, India) Topic: <i>Flexible supercapacitors and their integration with devices for next generation self-powered electronics</i>
16:10-16:20	O-11: Ms. Sakshi Kansal (Prime Minister Research Fellow, School of Energy Science and Engineering, IIT Kharagpur) Topic: <i>Electrochemical study of unique leaf-like morphology of Ni-Co LDH as high-performance positive electrode material for asymmetric supercapacitor</i>

16:20-16:35	SPONSOR (MILESTONE) <i>Title: Tackling Sample Preparation for Elemental Analysis in the Lithium-Ion Battery Industry</i>
16:35-17:45	Poster Session
16:35-16:37	P-16: Mr. Saurabh Kumar (RS, School of Materials Science and Technology, IIT BHU) Topic: <i>NaCr(SO₄)₂ : An eldfellite structured anode for sodium and lithium ion batteries</i>
16:37-16:39	P-17: Mr. Hari Narayanan Vasavan (PG, Indian Institute of Technology Indore) Topic: <i>Structural and Electrochemical Properties of P2-Type Na_{0.70}Ni_{0.20}Cu_{0.15}Mn_(0.65-x)Ti_xO₂ Cathode for Na-ion Batteries</i>
16:39-16:41	P-18: Mr. Nitin Srivastava (RS, Department of Physics, Institute of Science, Banaras Hindu University) Topic: <i>Electrochemical performance of Li/Mn-rich NMC cathode using nanocomposite blend gel polymer electrolyte for rechargeable Li-ion batteries</i>
16:41-16:43	P-19: Mr. Anupam Patel (RS, Department of Physics, Banaras Hindu University, Varanasi) Topic: <i>Graphitic carbon nitride (g-C₃N₄) and reduced graphene oxide (RGO) composite as high-performance anode material for sodium ion battery</i>
16:43-16:45	P-20: Mr. Anurag Tiwari (RS, Department of Physics, Institute of Science, Banaras Hindu University) Topic: <i>Study of sulfide based Na-ion conducting electrolyte for sodium solid state batteries</i>
16:45-16:47	P-21: Mr. Bibin P (RS, IISER Thiruvananthapuram) Topic: <i>Mass balancing and cell optimization of dual ion battery using deep neural network</i>
16:47-16:49	P-22: Mr. Raghvendra Mishra (RS, Banaras Hindu University) Topic: <i>Dual layer surface modification on P2-type Na_{0.7}[Ni_{0.35}Mn_{0.60}Co_{0.05}]O₂ cathode for long life sodium battery application</i>
16:49-16:51	P-23: Mr. Rupesh Kumar Tiwari (RS, Banaras Hindu University Varanasi, U.P.) Topic: <i>Carbon rich graphitic carbon nitride nano-sulfur copolymer composite cathode for high capacity rechargeable lithium-sulfur batteries</i>

16:51-16:53	P-24: Dr. Varun Kumar Singh (RS, Department of Physics and Astrophysics, University of Delhi) Topic: <i>Electrochemical Investigations of PVdF-HFP-NaTFSI-[BMPYr][TFSI] Polymer Electrolyte for Na-Rechargeable Battery</i>
16:53-16:55	P-25: Mr. Jibin M Joy (RS, Department of Energy Science and Engineering, IIT Delhi) Topic: <i>The adaptability of battery thermal management systems of the mobile application for stationary battery energy storage systems: An overview</i>
16:55-16:57	P-26: Mr. Vishnu Vardhan R (Faculty, P. A. College of Engineering and Technology, Pollachi, Tamilnadu) Topic: <i>CC3200 Based Battery Management System</i>
16:57-16:59	P-27: Dr. Manoj K. Singh (Faculty, Rajkiya Engineering College Banda) Topic: <i>Role of redox additive Methyl Blue on the performance of Supercapacitor</i>
16:59-17:01	P-28: Mr. Satyajit Ratha (RS, IIT Bhubaneswar) Topic: <i>Synthesis and characterization of patronite-reduced graphene oxide hybrids: high-performance supercapacitor electrodes for energy storage</i>
17:01-17:03	P-29: Mr. Sanjeev Verma (RS, IIT BHU, Varanasi) Topic: <i>Synthesis of Graphene oxide/Polyaniline (GO/PANI) binary nanocomposite and its use in supercapacitor electrode material application</i>
17:03-17:05	P-30: Mr. Rahul R (PG, Department of Physics, IIT Kharagpur) Topic: <i>Experimental and simulation study of graphene based supercapacitor with different aqueous electrolytes</i>
17:05-17:07	P-31: Mr. Yash G. Kapdi (PG, Department of Chemistry, Sardar Patel University, Gujarat) Topic: <i>Functionalized silica mesoporous nanoparticles for symmetric Supercapacitor</i>
17:07-17:09	P-32: Mr. Sanjaysinh N. Bariya (RS, Department of Chemistry, Sardar Patel University) Topic: <i>Functionalized Porous Covalent Organic Framework as a Promising Electrode Material in a Symmetrical Supercapacitor</i>
17:09-17:11	P-33: Mr. Bhanu Ranjan (RS, IIT Roorkee) Topic: <i>Rational growth of MoS₂ nanowires over NiTiCu nanostructured array for highly flexible and efficient Li⁺-ion supercapacitive electrodes</i>

17:11-17:13	P-34: Mr. Gaurav Kumar Yogesh (Faculty, Pranveer Singh Institute of Technology, Uttar Pradesh) Topic: <i>Research Trend in Development of Hybrid Supercapacitors-Fuel Cells Energy (SCs-FCs) Storage Device System for Electric Vehicle</i>
17:13-17:15	P-35: Dr. Pritamkumar Shinde (RS, Bhabha Atomic Research Centre, Mumbai) Topic: <i>Nickel hydroxide nanosheet assemblies with high specific capacitance of hydrangea-type bismuth molybdate: structural design and advanced electrochemical storage</i>
17:15-17:17	P-36: Dr. Ayan Mukherjee (Faculty, Dept. of Physics, College of Commerce, Arts & Science, Patna) Topic: <i>Influence of Nickel doping in Electrochemical performance of Cobalt oxide</i>
17:17-17:19	P-37: Mr. Arun Kumar (RS, Jamia Millia Islamia) Topic: <i>Hierarchically Surface-Engineered Template-Free Graphitic Carbon Nitride with ZnO Nanorods for Improved Electrochemical Performance</i>
17:19-17:21	P-38: Mr. Sougata Halder (PG, IIT Jodhpur) Topic: <i>Ion Transport Studies of Pectin Containing Ionic Liquid Electrolytes</i>
17:21-17:23	P-39: Mr. Sujan Malik (RS, Department of Physics, University of Burdwan) Topic: <i>Structural insight into the electrical properties of Gd₂NiTiO₆ double perovskite prepared via citrate auto-ignition method</i>
17:23-17:25	P-40: Mr. Arunmay Baidya (Faculty, Department of Physics, Mankar College) Topic: <i>Synthesis, Structural, Electrical and Dielectric Properties of Sm Doped Molybdate Ionic Conductors</i>
17:25-17:27	P-41: Mr. Vishnu Shankar Rai (RS, IIT BHU, Varanasi) Topic: <i>Dielectric and electrical characteristics of Bi_{2/3}Cu_{2.9}Ni_{0.1}Ti₄O₁₂ ceramic</i>
17:27-17:29	P-42: Mr. Mayank Kumar Singh (RS, IIT Indore) Topic: <i>Cu-MOF Interwoven CNT as a High performance Solid State Supercapacitor</i>

Day 3: March 30, 2022

Session-IX (New Trends: From Integrated Device to LCA and Energy Policy)	
Session Chair: Prof. Shivakiran B N Bhaktha	
10:00-10:25	IT-16: Prof. Brajesh Kumar Dubey (Department of Civil Engineering, IIT Kharagpur, India) Topic: <i>Journey of carbon material from your plate to your cellphone battery - Application of the circular economy approach</i>
10:25-10:50	IT-17: Dr. Ludmila Cojocaru (MOPGA Junior Researcher, Molecular Chemistry and Materials, Institute of Molecular Sciences, University of Bordeaux, France) Topic: <i>Integration perovskite solar cells-supercapacitors in compact and sustainable photo-storage devices</i>
10:50-11:00	O-12: Ms. Puja De (RS, Department of Physics, IIT Kharagpur, India) Topic: <i>Hydrothermally Synthesized V₂O₅ as an Advanced Cathode Material for Low-Cost Aqueous Aluminium Ion Battery</i>
11:00-11:10	O-13: Ms. Shilpa Khurana (RS, Department of Physics and Astrophysics, University of Delhi, India) Topic: <i>Flexible hybrid ionogels dispersed with surface modified SiO₂ nanoparticles</i>
11:10-11:30	High Tea
Session-X (Electrolyte - Liquid to Solid)	
Session Chair: Prof. Chandra Sekhar Tiwary	
11:30-12:05	PT-5: Prof. Amita Chandra (Department of Physics and Astrophysics, North Campus, University of Delhi) Topic: <i>Fillers in polymer electrolytes; Why?</i>
12:05-12:20	IT-18: Dr. Ananya Chowdhury (Research Scientist, IIT Bombay, India) Topic: <i>Optimizing the performance of maricite NaMnPO₄ based Na-ion supercapacitor: Moving towards non-aqueous electrolyte</i>
12:20-12:30	O-14: Mr. Shishir Kumar Singh (RS, Department of Physics, Banaras Hindu University) Topic: <i>Electrochemical investigation of double-layer (RGO and Li₂MoO₄) coated Li-NMC cathode with nano-composite gel polymer electrolyte for safer Li-battery applications</i>

12:30-12:40	O-15: Mr. Arghyadeep Sau (RS, Department of Metallurgical and Materials Engineering, IIT Kharagpur, India) Topic: <i>Studies on the electrodeposition of tin over porous nickel current collectors from non-aqueous electrolytes and its application as negative electrode in Li-ion rechargeable batteries</i>
12:40-13:00	SPONSOR (MERCK)
13:00-14:00	Lunch Break
Session-XI (Non Li-ion Devices)	
Session Chair: Prof. Amar Nath Gupta	
14:00-14:25	IT-19: Prof. Benedicte Vertruyen (University of Liege, Belgium) Topic: <i>Spray-drying synthesis routes for phosphates and other electrode materials</i>
14:25-14:50	IT-20: Prof. Ts. Dr. Muhd Zu Azhan Yahya (Deputy Vice Chancellor, National Defence University of Malaysia, Malaysia) Topic: <i>Molybdenum Substitution in Na₃V₂(PO₄)₃ Cathode Material for Sodium Ion Batteries: A First Principles Study</i>
14:50-15:00	O-16: Mr. Hiren K. Machhi (RS, Department of Chemistry, Sardar Patel University) Topic: <i>Metal Organic Framework Integrated Zinc Anode Suppressing the Dendrite Formation for Stable Aqueous Zinc Iodine Battery</i>
15:00-15:10	O-17: Mr. Jitendra Kumar Yadav (RS, Indian Institute of Technology Jodhpur, India) Topic: <i>Fabrication of Low-cost, Dendrite free Rechargeable Iron-ion battery in Ambient condition for Stationary Applications</i>
15:10-15:25	High Tea
Session-XII (Supercapacitor and Battery Performance)	
Session Chair: Prof. P. S. Burada	
15:25-15:35	O-18: Dr. Shivendra Kumar Jaiswal (Assistant Professor, Department of Physics, National Institute of Technology Patna, India) Topic: <i>Novel cerium doped (Ba,Sr)(Fe,Ce)O_{3-δ} perovskite membranes for oxygen separation application</i>
15:35-16:00	IT-21: Prof. Dr. Ashis Kumar Satpati (Analytical Chemistry Group, Bhabha Atomic Research Centre, India) Topic: <i>Improvised synthesis strategy and electrochemical evaluation of metal oxide and sulphide as supercapacitor electrodes</i>

16:00-16:15	IT-22: Dr. Sudipta Biswas (Scientist, Ben Gurion University of the Negev, Israel) Topic: <i>Modulating the nano-level interfaces of supercapacitor by the applied external vibration</i>
16:15-16:25	O-19: Mr. Vishnu Surendran (RS, IISER Thiruvananthapuram, India) Topic: <i>A Simple and Generalized Semi-Empirical Approach to Mass Balancing of Hybrid Ion Capacitor Electrodes</i>
16:25-16:35	O-20: Mr. Suyash Vikram (Research Scholar, Department of Energy Science and Engineering, IIT Delhi, India) Topic: <i>Performance analysis of liquid-based battery thermal management system for various coolants under standard Indian drive cycle</i>
16:35-17:00	Valedictory Session
17:00-17:30	High Tea (Venue: Foyer of Physics Department, IIT Kharagpur)