

48th Power Sources Conference 2018

Denver, Colorado, USA
11-14 June 2018

ISBN: 978-1-7138-0810-7

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2018) by Power Sources Conference
All rights reserved.

Printed with permission by Curran Associates, Inc. (2021)

For permission requests, please contact Power Sources Conference
at the address below.

Power Sources Conference
Palisades Convention Management
411 Lafayette Street, Suite 201
New York, NY 10003

Phone: (212) 460-8090 ext. 202
Email: mgoldfarb@pcm411.com

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

WHAT CAN WE LEARN FROM THE SAMSUNG GALAXY NOTE7 BATTERY SAFETY EVENT.....	1
<i>S. De-Leon</i>	
TEMPERATURE ADJUSTABLE THERMAL MANAGEMENT SYSTEM WITH THERMAL RUNAWAY PROTECTION FOR LI ION PACKS	2
<i>M. Hartmann</i>	
CONSUMER BATTERY FIRES-FAILURE TRENDS	6
<i>M. Eskra, P. Ralston</i>	
SAFETY OF HIGH ENERGY SOLDIER WEARABLE BATTERIES.....	9
<i>D. Shoemaker, T. Thampan, A. Ruth</i>	
REMAINING USEFUL LIFE PREDICTION OF LITHIUM-ION BATTERIES USING MULTIPLE MODEL PARTICLE FILTER.....	13
<i>C. Hu, H. Ye, G. Jain, C. Schmidt</i>	
AN ANALYSIS OF HYBRIDIZATION METHODS AND TECHNIQUES FOR CF _x -MNO ₂ BLENDS	17
<i>P. Latorre, T. Atwater</i>	
LI / CF _x CELLS FOR EXTREME LOW TEMPERATURE AND HIGH POWER APPLICATIONS.....	21
<i>R. Tamaki, H. Nakahara, S. Mohanty</i>	
EFFECTS OF LOW TEMPERATURE DISCHARGE ON PERFORMANCE OF LITHIUM OXYHALIDE PRIMARY CELLS	25
<i>A. Johnson, Y. Wang</i>	
NOVEL HYBRID CATHODE INCORPORATING CARBON MONOFLUORIDE AND PHTHALOCYANINE FOR PRIMARY LITHIUM BATTERIES.....	29
<i>J. Fellner, M. Tsao</i>	
DRY ELECTRODE COATING TECHNOLOGY	33
<i>H. Duong, J. Shin, Y. Yudi</i>	
THE EFFECT OF GRAIN SIZE ON THE ELECTROCHEMICAL AND MECHANICAL PROPERTIES OF CUBIC LI ₇ LA ₃ ZR ₂ O ₁₂	37
<i>J. Wolfenstine, J. Allen</i>	
LOW COST, HIGH SPEED, AGILE AUTOMATED LASER ELECTRODE CUTTER	40
<i>S. Cordova, S. Arzberger, W. Xing</i>	
SAFETY ENHANCED, BLOCK COPOLYMER DERIVED NANOPOROUS BATTERY SEPARATORS	44
<i>W. Xing, S. Cordova, S. Arzberger</i>	
ADVANCED LITHIUM ION MANUFACTURING PROCESSES FOR HIGH PERFORMING BATTERIES	48
<i>P. Zhang, R. Sosik, C. Silkowski, H. Wang, F. Nunez, M. Wixom</i>	

GUIDELINES FOR SAFE, HIGH PERFORMING LI-ION BATTERY DESIGNS FOR MANNED VEHICLES	49
<i>J. Darst, J. Thomas, D. Finegan, E. Darcy</i>	
COPPER DISSOLUTION INVESTIGATIONS IN LARGE-FORMAT LITHIUM-ION CELLS	53
<i>C. Hendricks, A. Mansour, D. Fuentevilla, J. Ko, G. Waller</i>	
SAFER BY DESIGN: LIMITED THERMAL EVENT PROPAGATION IN NMC POUCH-BASED BATTERIES	57
<i>J. Diller</i>	
SAFETY ASPECTS OF CYCLIC AGED COMMERCIAL LITHIUM-ION CELLS'	61
<i>T. Lian, P. Vie, M. Gilljam, S. Forseth</i>	
RECHARGEABLE, AQUEOUS ZINC-ION BATTERIES WITH PULSE-POWER CAPABILITY ENABLED BY NANOSTRUCTURED MANGANESE OXIDES AND MIXED-SALT ELECTROLYTES.....	65
<i>J. Long, J. Ko, M. Sassin, J. Parker, D. Rolison</i>	
OPTIMIZING COULOMBIC EFFICIENCY OF ALL-IRON REDOX-FLOW CELL	69
<i>B. Jayathilake, B. Zayat, E. Plichta, M. Hendrickson, S. Narayanan</i>	
DESIGN AND PERFORMANCE OF LARGE FORMAT NICKEL-ZINC BATTERIES	73
<i>E. Listerud, A. Weisenstein</i>	
GREEN SEAL® TECHNOLOGY: REVOLUTIONIZING BATTERY DESIGN	77
<i>M. Roma, J. Regalado, E. Shaffer</i>	
NANOSCALE MATERIAL DESIGN OF ZINC ANODES FOR HIGH-ENERGY RECHARGEABLE AQUEOUS BATTERIES.....	81
<i>N. Liu</i>	
SOLVENT-FREE AND NON-SINTERED ALL SOLID STATE BATTERY	82
<i>P. Zhang, R. Sosik, F. Nunez, M. Wixom</i>	
VOLTAGE TUNABLE INDUCTORS FOR MHZ ADAPTIVE POWER SYSTEMS.....	83
<i>N. Sun, Y. Gao, A. Matyushov, X. Shi, N. Sun, M. Sanghadasa</i>	
SOTERIA ARCHITECTURE CELL MATERIALS	87
<i>C. Hu</i>	
BIO-SILICA FROM CULTURED DIATOMS FOR ENERGY STORAGE - FLEXIBLE ELECTRODES AND SUPERCAPACITORS.....	91
<i>E. Karaman, Z. Wang, G. Di Benedetto, J. Zunino, X. Meng, S. Mitra</i>	
LI-ION BATTERY FAILURE: LINKING EXTERNAL RISKS TO INTERNAL EVENTS'	95
<i>D. Finegan, W. Walker, J. Darst, R. Jervis, T. Heenan, J. Hack, A. Rack, P. Shearing, M. Keyser, E. Darcy</i>	
IMPLEMENTATION OF INTERNAL SHORT CIRCUIT DETECTION FOR ENHANCED SAFETY IN DOD BATTERIES'	99
<i>C. McCoy, T. Kotwal, S. Sriramulu, B. Barnett</i>	
STATE-OF-HEALTH FOR BATTERY STRINGS WITH RAPID MULTISPECTRAL IMPEDANCE MEASUREMENTS	103
<i>J. Christophersen, S. Sazhin, C. Ho, C. Hendricks</i>	

DEVELOPMENT OF A NONFLAMMABLE ELECTROLYTE FOR LI-ION BATTERIES.....	107
<i>C. Lang, P. Moran, J. Herb</i>	
FAILURE ANALYSIS DURING MECHANICAL ABUSE OF LITHIUM ION BATTERIES	109
<i>J. Rempel, R. Stringfellow, S. Hui, J. Lau, S. Sriramulu, B. Barnett</i>	
IPOWER: DISMOUNTED SOLDIER ENERGY ANALYSIS AND MISSION PLANNING TOOLS	113
<i>R. Stroman, C. Buesser, E. Leadbetter, D. Milliken, J. Collazo</i>	
PERFORMANCE ENHANCEMENT OF IMPULSE LOADED ENERGY HARVESTERS THROUGH TIME VARYING IMPEDANCE	117
<i>N. Sharpes</i>	
EXPERIMENTAL VERIFICATION OF THE MAGNETIC FIELD OF AN ELECTROMAGNETIC ALTERNATOR.....	121
<i>C. Mullen</i>	
CHARACTERIZATION OF ENERGY HARVESTING RUCK SACK.....	125
<i>A. Moy, J. Douglas, N. Sharpes, C. Mullen</i>	
FORMATION OF JOINT MUNITIONS POWER SOURCES INTEGRATED PRODUCT TEAM	126
<i>A. Pergolizzi</i>	
SPACE-BASED ENERGY STORAGE TECHNOLOGY DEVELOPMENT AT THE U.S. AIR FORCE RESEARCH LAB	127
<i>J. Buckner, D. Wilt, J. Cromer, K. Montgomery</i>	
OVERVIEW OF POWER IN FUZE AND MUNITIONS APPLICATIONS.....	131
<i>B. Armstrong</i>	
POWER QUALITY IN A TACTICAL APPLICATION: WHAT IS PQ? WHY IS IT IMPORTANT?	132
<i>W. Magill, L. Leitao</i>	
INVESTIGATION OF ENERGY CONVERSION CHARACTERISTICS OF REVERSIBLE ENERGY STORAGE SYSTEM COMPRISED OF ELECTROLYSIS, HYDROGEN STORAGE ALLOY, AND FUEL CELL	135
<i>S. Cho, G. Han, J. Bae</i>	
THERMAL MANAGEMENT OF HYDROGEN STORAGE SYSTEM BASED ON METAL HYDRIDE	138
<i>H. Roh, S. Cho, J. Kim, M. Kim, B. Lee</i>	
LiNi _{0.33} Mn _{0.33} Co _{0.33} O ₂ (NMC) SUBMICRONIC PARTICLES SYNTHESIS AND IMPLEMENTATION OF THE LI-ION BATTERY ELECTRODE BY USING PRINTING PROCESS.....	141
<i>D. Peralta, J.-F. Colin, F. Fabre, B. Amestoy, J. Salomon</i>	
CARBON FREE SILICA SUPPORTED PT BIFUNCTIONAL ELECTROCATALYST FOR UNITIZED REGENERATIVE FUEL CELLS	145
<i>S.-H. Roh, H.-Y. Jung</i>	
LOW PERMEABLE COMPOSITE MEMBRANE WITH SULFONATED POLY(PHENYLENE OXIDE) (SPPO) AND SULFONATED SILICA FOR THE OPERATION OF REDOX FLOW BATTERY.....	149
<i>S.-H. Roh, H.-Y. Jung</i>	

BALLISTIC TESTING OF PRESSURIZED HYDROGEN STORAGE CYLINDERS.....	153
<i>B. Paczkowski</i>	
STANDALONE, LIGHT-WEIGHT, COMPACT POWER GENERATORS.....	157
<i>A. Anderson, S. Roychoudhury, C. Junaedi, S. Vilekar, T. Labreche, D. Spence, R. Mastanduno, M. Steinbroner</i>	
CAPILLARY PRESSURE VERSUS SATURATION CHARACTERIZATION OF MOLTEN-SALT POWER SOURCE SEPARATOR MATERIALS.....	159
<i>A. Headley, M. Nemer, C. Roberts, R. Solich</i>	
MANUFACTURING LOW-COST NANO-COATINGS FOR HIGH PERFORMANCE BATTERY MATERIALS.....	163
<i>M. Herbert-Walters, J. Trevey, B. Hughes</i>	
LITHIUM ION BATTERY OFF-GAS MONITORING FOR BATTERY HEALTH AND SAFETY.....	164
<i>S. Swartz, S. Cummings, N. Frank, W. Dawson</i>	
THE “GREEN LATRINE”: DEPLOYABLE LATRINE WITH OFF-GRID PHOTOVOLTAIC/THERMAL ENERGY.....	168
<i>M. Tomac, S. Morse, D. Dixon, M. Farrington, R. Petty, J. Bogaert, B. Baumgardner, R. Salavani</i>	
OPERATIONAL SAFETY ANALYSIS OF LASER POWER BEAMING.....	172
<i>E. Conrad, W. Rowley, T. Thampan</i>	
EXPERIMENTAL PARTICLE-IN-CELL SIMULATION OF POSITIVE ION INFLUENCE ON VACUUM DIODE.....	173
<i>W. Rowler, E. Conrad, T. Thampan</i>	
FUEL CELL POWERED SMALL UNMANNED AERIAL SYSTEM (SUAS) LESSONS LEARNED AND THE ROAD AHEAD.....	174
<i>D. Chu, R. Jiang</i>	
AIR INDEPENDENT POWER FOR UNDERWATER APPLICATIONS.....	177
<i>J. Reeh, J. Stevens, J. Zbranek, B. Hennings</i>	
LIGHTWEIGHT SYSTEM DESIGN AND DEMONSTRATION OF A HIGH RELIABILITY, AIR INDEPENDENT, PEMFC POWER SYSTEM FOR AN UNTETHERED SUBSEA POWER NODE`.....	181
<i>R. Utz, R. Wynne, M. Miller, R. Sievers, T. Valdez</i>	
ALTERNATIVE ENERGY: POWERING ARMY MODERNIZATION.....	185
<i>J. Douglas, N. Sharpes, A. Moy, C. Mullen, C. Hurley</i>	
HIGH-PERFORMANCE BODY ARMOR-INTEGRATED, MULTI-FUNCTIONAL BATTERIES FOR DISMOUNTED SOLDIER.....	189
<i>B. Henslee, J. Monat</i>	
LIGHTWEIGHT 0.4 – 3 KW SOLDIER-PORTABLE JP-8/DF-2 GENERATORS.....	190
<i>T. Labreche, D. Spence, R. Mastanduno, S. Roychoudhury</i>	
ADVANCES IN BETAVOLTAICS, A RADIOISOTOPE POWER SOURCE FOR LONG-LIFE AND HIGH ENERGY DENSITY APPLICATIONS.....	193
<i>T. Adams, S. Revankar, D. Cheu, P. Cabauy, B. Elkind</i>	

USB 3.1 CAPABILITIES AND CONSIDERATIONS FOR THE DISMOUNTED SOLDIER	197
<i>D. Milliken, J. Collazo</i>	
LITHIUM RECHARGEABLE POUCH FLEXIBLE BATTERIES	200
<i>S. De-Leon</i>	
HIGH ENERGY DENSITY AND SPECIFIC ENERGY SILICON ANODE-BASED BATTERIES	201
<i>C. Stefan</i>	
POTASSIUM AND COBALT-DOPED LITHIUM MANGANESE SPINEL CELLS FOR USE IN RECHARGEABLE BATTERY APPLICATIONS.....	205
<i>Y. Howarth, T. Atwater</i>	
ULTRA-THIN, FLEXIBLE SOLID-STATE BATTERY WITH INTEGRATED SOLAR ENERGY HARVESTING	209
<i>B. Berland, C. Sprangers, A. Compaan, V. Plotnikov, D. Carey, J. Olenick, K. Olenick</i>	
A NEW DESIGN APPROACH TO LI-ION CELLS FOR LEO APPLICATIONS	213
<i>C. Ma, Y. Borthomieu</i>	
OPERANDO SPECTROSCOPY OF THE ELECTROCHEMICAL OXIDATION OF CARBON MONOXIDE OVER NI-YSZ ANODE-SUPPORTED SOLID OXIDE FUEL CELLS: A STUDY OF SIMULATED SYNGAS MIXTURES.....	216
<i>W. Maza, D. Steinhurst, S. Tsoi, J. Owrutsky</i>	
RECENT ACHIEVEMENTS WITH ALANE (ALUMINUM HYDRIDE, ALH ₃) AND FUEL CELL POWER SYSTEMS	220
<i>D. Braithwaite, C. Helland, T. Dubois, T. Thampan, C. Schumacher</i>	
STANDALONE, LIGHT-WEIGHT DIESEL/JET-FUELED FUEL CELL GENERATORS.....	224
<i>S. Roychoudhury, C. Junaedi, S. Vilekar, T. Labreche, R. Mastanduno</i>	
MORPHOLOGY AND CHEMICAL STRUCTURE OF MODIFIED NITROGEN-DOPED GRAPHENE FOR HIGHLY ACTIVE OXYGEN REDUCTION REACTIONS	227
<i>H. Singh, S. Zhuang, B. Nunna, E. Lee</i>	
SATES OF WATER IN THERMALLY ANNEALED RECAST NAFION® FILMS AND IMPACT ON FUEL CELL PERFORMANCE.....	231
<i>X. Ren, E. Gobrogge, F. Beyer</i>	
HYDROGEN FUELS FROM SOLAR ENERGY AND WATER: USING INEXPENSIVE 2D TRANSITION METAL NITRIDES	235
<i>A. Djire, H. Zhang, J. Liu, E. Miller, N. Neale</i>	
SELF-CONTAINED ENERGY HARVESTING SENSOR SYSTEM.....	236
<i>A. Aguilar, T. Larson, A. Davies, H. Hess</i>	
INTEGRATED ENERGY SOLUTIONS FOR COLD WEATHER OPERATIONS FROM SOLDIER TO DEPLOYED CAMPS	240
<i>E. Andrukaitis</i>	
ELECTROCHEMICAL EVALUATION OF ATOMIZER EFFECT ON E-CIGARETTE SAFETY	244
<i>D. Shoemaker, Y. Chan</i>	
ATOMIC LAYER DEPOSITION: A SCALABLE PROCESS FOR ENABLING THE NEXT GENERATION OF HIGH PERFORMANCE MATERIALS	248
<i>B. Hughes, M. Herbert-Walters, J. Trevey</i>	

PERFORMANCE STUDIES OF FE-RICH AND CU-RICH $\text{Cu}_x\text{Fe}_{1-x}\text{F}_2$ CONVERSION CATHODE MATERIALS	249
<i>J. Ko, D. Fuentevilla, A. Mansour</i>	
HIGH VOLTAGE DOUBLE DOPED LITHIUM SPINEL CATHODES, $\text{Li}_x\text{Mn}_{1.9}\text{Co}_{0.04}\text{Fe}_{0.06}\text{O}_4\text{Cl}_D$, SYNTHESIZED VIA CITRIC ACID METHOD.....	250
<i>M. Limpert, T. Atwater</i>	
ELECTROCHEMICAL PERFORMANCE OF $\text{Li}_x\text{Mn}_{2-y}\text{Fe}_y\text{O}_{4-z}\text{S}_z$ CATHODE MATERIAL WITH CONSTANT VOLTAGE APPLICATION.....	254
<i>A. Ruth, P. Latorre, A. Karalekas, T. Atwater</i>	
SAFE LITHIUM-ION BATTERY DEVELOPMENT	258
<i>U. Janakiraman, L. Wittmaier, M. Destephen, J. Bond</i>	
LI-ION CAPACITOR/LI-ION BATTERY HYBRID ENERGY STORAGE CELL	262
<i>J. Zheng, A. Shellikeri, M. Hagen, J. Yan, B. Cao, R. Jow, J. Read</i>	
HIGH CAPACITY, HIGH POWER, LITHIUM-ION SUPERCAPACITOR/BATTERY HYBRIDS USING LAYERED HYBRID ELECTRODE FOR MILITARY APPLICATIONS.....	266
<i>D. Wu, J. Fan</i>	
THE EFFECTS OF POTASSIUM FERROCYANIDE/POTASSIUM FERRICYANIDE AND THEIR DERIVATIVES ON THE PERFORMANCE OF SOLID-STATE SUPERCAPACITOR.....	270
<i>X. Zhou, X. Qiao, C. Zhang, Y. Wang, A. Mansour, G. Waller, C. Martin</i>	
ELECTROCHEMICAL PERFORMANCE OF LITHIUM-ION CAPACITORS EVALUATED UNDER HIGH STRESS CONDITIONS FOR FAST CHARGE DEVICES	274
<i>J. Boltersdorf, S. Delp, J. Yan, B. Cao, J. Zheng, T. Jow, J. Read</i>	
NANOSTRUCTURED CARBIDE MATERIALS ENABLE HIGH PERFORMANCE PSEUDOCAPACITORS IN Mg^{2+} ION ELECTROLYTES	278
<i>X. Zang, L. Lin, M. Sanghadasa</i>	
SULFUR-CARBON COMPOSITES AND SOLID STATE ELECTROLYTES IN LITHIUM SULFUR BATTERIES	282
<i>F. Zalar, P. Bhattacharya, J. Kumar, B. Henslee</i>	
ADVANCED LITHIUM SULFUR TECHNOLOGIES FOR HIGH RATES AND LONG LIFE	283
<i>P. Zhang, M. Wixom, H. Wang, F. Nunez</i>	
ENERGY DENSITY LIMITATION OF LITHIUM-SULFUR BATTERY	284
<i>J. Zheng, C. Shen, J. Xie, M. Zhang, P. Andrei, M. Hendrickson, E. Plichta</i>	
HIGH CHARGE AND DISCHARGE POWER LI-ION PRISMATIC CELLS.....	288
<i>F. Puglia, S. Trebukhova, B. Ravdel, S. Santee, C. Cook</i>	
DEVELOPMENT OF LITHIUM SULFUR CELLS TOWARDS COMMERCIALIZATION.....	292
<i>S. Jones, R. Bugga, J.-P. Jones, F. Krause, J. Pasalic, M. Hendrickson, E. Plichta, D. Ainsworth, G. De Forton</i>	
THE HYBRID TIGER: A LONG ENDURANCE SOLAR/FUEL CELL/SOARING UNMANNED AERIAL VEHICLE	295
<i>R. Stroman, D. Edwards, P. Jenkins, S. Carter, D. Newton, M. Kelly, S. Heinzen, T. Young, V. Dobrokhodov, J. Langelaan, J. Bird, P. Reinecke</i>	

FLEXIBLE HYBRID ENERGY SYSTEM FOR PULSED POWER APPLICATIONS	299
<i>B. Hennings, J. Reeh, J. Varughese</i>	
BB-2590 HYBRID ELECTRICAL ENERGY STORAGE SYSTEM.....	302
<i>S. Cordova, S. Arzberger, W. Xing</i>	
HYBRID ENERGY STORAGE SYSTEM FOR TACTICAL MICROGRIDS	306
<i>F. Bohn, J. Vitale, B. Wilson, D. Teicher, T. Podlesak, D. Stephens, M. Gonzalez, S. Siegfried, B. Stanley, J. Lynch</i>	
BIDIRECTIONAL POWER FLOW CONTROL IN PORTABLE HYBRID POWER SOURCE FOR PULSED POWER APPLICATIONS	310
<i>K. Waterman, J. Tudino, R. Sepe</i>	
5 V PHOSPHATE LITHIUM-ION CATHODE	314
<i>J. Allen, S. Delp, J. Wolfenstine, T. Jow</i>	
LITHIUM-OXYGEN BATTERIES USING PHTHALOCYANINE AS CATALYST	318
<i>P. Kichambare, S. Rodrigues, L. Scanlon</i>	
RECHARGEABLE ZN–AIR BATTERIES ENABLED BY MULTIFUNCTIONAL AIR CATHODES AND ZN SPONGE ANODES	322
<i>J. Parker, J. Ko, D. Rolison, J. Long</i>	
KINETICS AND MECHANISMS OF THE OXYGEN ELECTRODE REACTIONS IN LITHIUM-AIR BATTERIES.....	325
<i>K. Abraham, A. Alsudairi, S. Mukerjee, E. Plichta, M. Hendrickson</i>	
DIRECT RECYCLING OF NICKEL RICH SCRAP CATHODES	329
<i>S. Sloop, M. Lerner, W. Xu, J. Trevey</i>	
EVALUATION AND CHARACTERIZATION OF COTS LI-ION CELLS FOR MILITARY APPLICATIONS.....	332
<i>S. Trebukhova, C. Deroy, F. Puglia, R. Gitzendanner</i>	
ADVANCES IN ELECTROCHEMISTRY DEVELOPMENT AT SAFT	336
<i>J. Park, C. Margez, X. Chen, K. Kylyvnyk, T. Greszler</i>	
SAFT’S POUCH PRODUCT AND CAPABILITY	340
<i>C. Margez, J. Dong, S. Peterson, S. Tokuoka, T. Greszler</i>	
HIGH PERFORMANCE SAFE LI-ION BATTERY SYSTEMS.....	344
<i>R. Tamaki, H. Nakahara</i>	
HIGH TECH CELL MANUFACTURING OF AMERICAN MADE CELLS FOR MILITARY APPLICATIONS.....	348
<i>K. Hykin, F. Nunez, C. Silkowski, M. Wixom</i>	
ALL-SOLID-STATE BATTERY-ULTRACAPACITOR HYBRID DEVICES BASED ON NANOSTRUCTURED MATERIALS.....	349
<i>E. Bekyarova, M. Itkis, S. Kalinin, J. Dai, L. Hu, . Li, C. Hu, M. Sanghadasa</i>	
HIERARCHICAL POWER MANAGEMENT OF UNMANNED AERIAL VEHICLES.....	352
<i>L. Herrera, C. Skipper, M. Rottmayer, B.-H. Tsao</i>	
TESTING SPARK IGNITION ENGINES CONVERTED TO OPERATE ON JP-8.....	356
<i>M. Seibert, T. Dubois, R. Scenna, T. Thampan</i>	

OIL ANALYSIS FOR PROGNOSTIC DIAGNOSTICS APPLICATIONS	360
<i>R. Scenna, T. Dubois, M. Seibert</i>	
COMPARING VARIOUS CAPACITOR TYPES FOR HIGH POWER APPLICATIONS	364
<i>K. Chu, Y. Howarth, T. Atwater</i>	
ABUSE TOLERANT ELECTROLYTES.....	368
<i>S. Moganty</i>	
HIGH ENERGY/POWER DENSITY, SAFE LITHIUM BATTERY WITH NONFLAMMABLE ELECTROLYTE.....	369
<i>W. Xing, S. Cordova, S. Arzberger</i>	
ULTRATHIN POLYMER COATINGS TO IMPROVE ELECTRODE STABILITY UNDER ABUSIVE CONDITIONS	373
<i>R. Carter, J. Long, J. Parker, M. Sassin, C. Love</i>	
SURFACE CHEMISTRY EVOLUTION IN HIGH-POWER LITHIUM-ION CATHODES.....	377
<i>G. Waller, A. Mansour, C. Hendricks, J. Ko, D. Fuentevilla</i>	
HIGH-NICKEL CATHODE / GRAPHITE ANODE CELLS FOR DIVERSE DOD APPLICATIONS.....	381
<i>J. Rempel, A. Pullen, D. Kaplan, B. Barnett, S. Sriramulu</i>	
HIGH ENERGY LI-ION CELLS WITH CAM-7® CATHODE AND SI-BASED ANODES	385
<i>J. Rempel, D. Ofer, A. Pullen, D. Kaplan, B. Barnett, S. Sriramulu</i>	
HIGHER ENERGY DENSITY LI-ION BATTERY DEVELOPMENT	389
<i>C. Lang, P. Moran</i>	
ADVANCED LI-ION CELL DEVELOPMENT	391
<i>C. Lang, P. Moran, J. Herb</i>	
DEVELOPMENT OF HIGH ENERGY AND HIGH SAFETY LITHIUM-ION POLYMER CELLS FOR MULTIFUNCTIONAL BATTERY (MFB) POWER SOURCES USED IN BATTLEFIELD AIR OPERATIONS.....	393
<i>Z. Xu, C. Chai, T. Howell, M. Rottmayer, L. Harrington, S. Rodrigues</i>	
NOVEL MATERIALS FOR HIGH VOLTAGE THERMAL BATTERIES.....	397
<i>J. Edington, Z. Van Zandt, K. Haines, I. Mills, M. Sanghadasa</i>	
FULL SCALE THERMO ELECTRIC MODEL OF THERMAL BATTERIES	401
<i>O. Shkury, I. Immer</i>	
MODELING OF PYROTECHNIC COMBUSTION BEHAVIOR AND TEMPERATURE DISTRIBUTION FOR THE IGNITION PHASE OF THERMAL BATTERIES.....	405
<i>T. Koyuncu, A. Alkan, K. Sevim, Y. Yesilirmak, E. Unsal, A. Gocmez</i>	
EXPERIMENTAL CHARACTERIZATION AND MODELING OF THERMAL BATTERY INSULATION MATERIALS	409
<i>A. Headley, A. Robbins, M. Hileman, C. Roberts, E. Piekos, P. Fleig, R. Solich, A. Martinez</i>	
SOIL-SCIENCE MECHANICAL/CAPILLARY PRESSURE/ELECTRICAL TESTING METHODS APPLIED TO MOLTEN-SALT POWER-SOURCE SEPARATOR MATERIALS.....	413
<i>M. Nemer, C. Roberts, H. Papenguth, P. Fleig, L. Johnson, B. Hernandez-Sanchez, A. Headley</i>	

ADVANCED ELECTROLYTE SOLVENTS TO ENABLE HIGH ENERGY LITHIUM ION BATTERIES	417
<i>T. Johnson, M. Usrey, P. Du, D. Gilbert</i>	
ANALYSIS OF THE AGING MECHANISMS IN A COMMERCIAL LIFEP ₄ /GRAPHITE 26650 CYLINDRICAL CELL BY FIB-SEM TOMOGRAPHY	421
<i>R. Scipioni, P. Jorgensen, D. Stroe, R. Younesi, S. Simonsen, P. Norby, J. Hjelm, S. Jensen</i>	
REVERSIBILITY OF THE LITHIUM INSERTION PROCESS IN LI-ION BATTERIES STUDIED BY ELECTROCHEMICAL IMPEDANCE SPECTROSCOPY	425
<i>R. Scipioni, D. Ren, S. Barnett</i>	
UNRAVELING EFFECTS OF PROTECTIVE COATINGS ON LIMN ₂ O ₄ THIN FILM CATHODES FOR LITHIUM ION BATTERIES.....	429
<i>X. Yu, R. Scipioni, Y.-B. Xu, J. Wu, S. Barnett</i>	
LITHIUM-SULFUR BATTERY WITH A ROBUST SULFUR ELECTRODE AND MIXED CONDUCTION MEMBRANE.....	433
<i>A. Irshad, B. Jayathilake, R. Elizalde-Segovia, D. Moy, E. Plichta, M. Hendrickson, S. Narayanan</i>	
BENEFITS AND LIMITATIONS OF E-TEXTILE POWER AND DATA DISTRIBUTION SYSTEMS.....	437
<i>E. Wise</i>	
AUTO-TUNING FOR TACTICAL MICROGRIDS: MODEL-BASED APPROACH	441
<i>B. Wilson, J. Vitale, F. Bohn, H. Garcia, D. Teicher, J. Lynch, T. Podlesak, D. Stephens, M. Gonzalez, S. Siegfried, B. Stanley</i>	
CONSIDERATIONS OF GENERATION AND ENERGY STORAGE IN AN EMERGENCY MICROGRID	445
<i>P. Penkey, B. Johnson, H. Hess</i>	
ACCELERATED AGING OF LI(SI)/COS ₂ THERMAL BATTERIES.....	449
<i>D. Wesolowski, M. Sanchez, A. Allen, C. Staiger, N. Missert, A. Ambrosini, R. Jarek, T. Anderson</i>	
ADVANCED NANOSTRUCTURING AND ENHANCED PERFORMANCE OF THERMAL BATTERY CATHODE MATERIALS.....	453
<i>L. Morris, G. Di Benedetto, D. Swanson, B. Wightman, C. McMullan, R. Dratler</i>	
HISTORICAL PRODUCTION OF MAGLITE S AND THE DEVELOPMENT OF A NEW MAGNESIUM-OXIDE BINDER FOR THERMAL BATTERIES.....	457
<i>H. Papenguth, M. Nemer, C. Roberts, R. Moore, T. Boyle</i>	
DEVELOPMENT OF MULTIVALENT CHEMISTRIES FOR THERMAL BATTERIES.....	461
<i>S. Dickson, R. Gover, J. Irvine</i>	
SUPPORTING CREDIBILITY OF SINGLE CELL THERMAL BATTERY MODELING THROUGH V&V/UQ ACTIVITIES.....	465
<i>B. Schroeder, E. Allcorn, J. Hewson, H. Moffat, E. Piekos, B. Trembacki, T. Voskuilen, S. Roberts</i>	
ACOUSTIC MONITORING OF THERMAL BATTERIES FOR EVENT DETECTION.....	469
<i>J. Dellinger, C. Cassano, T. Anderson, S. Ferreira, C. Keane, A. Fresquez, J. Serrano, M. Heise, M. Schindelholz</i>	

THERMAL BATTERY ACTIVATION USING HEAT PAPER FUSES	473
<i>J. Reinig, B. Jantson</i>	
THERMAL BATTERY DESIGN CONSIDERATIONS FOR HYPERSONIC VEHICLE FLIGHT TEMPERATURE ENVIRONMENTS.....	474
<i>B. Jantson, J. Reinig, E. Scherzberg, J. Briscoe</i>	
TABS: A THERMAL BATTERY DESKTOP DESIGN TOOL	477
<i>S. Roberts, C. Jove-Colon, H. Moffat, M. Neilsen, E. Piekos, B. Schroeder, B. Trembacki, T. Voskullen</i>	
MULTI-PHYSICS COST AND COMPLEXITY REDUCTION STRATEGIES FOR MODELING THERMALLY ACTIVATED BATTERIES	481
<i>T. Voskuilen, C. Jove-Colon, H. Moffat, B. Schroeder, B. Trembacki, S. Roberts</i>	
ADVANCE SI ANODE FOR HIGH ENERGY LITHIUM ION CELLS	485
<i>P. Zhang, M. Wixom</i>	
EFFECT OF STATE OF CHARGE AND DEPTH OF DISCHARGE ON THE CYCLE LIFE OF LIFE PO ₄ /GRAPHITE CELL AT FAST CHARGING FOR ELECTRIC VEHICLE APPLICATION.....	486
<i>V. Rikka, A. Chatterjee, R. Prakash, R. Gopalan, G. Sundararajan</i>	
CONVERSION MECHANISM OF CU ₂ F ₂ FOR SECONDARY BATTERIES.....	487
<i>K. Carroll, D. Strand, B. Li</i>	
UTILIZING CUSTOM AND COMMERCIAL LI ⁺ ION CELLS FOR SPACE APPLICATIONS	488
<i>B. Cardwell</i>	
DEVELOPMENT OF HIGH ENERGY LI-ION CELL AND CHEMISTRY	489
<i>H. Bang, X. Su, A. Yang, A. Benmayza, M. Destephen</i>	
NOVEL HIGH SENSITIVITY CELL SCREENING TECHNOLOGY FOR REDUCING FORMATION TIME AND IMPROVING CELL SORTING	493
<i>C. McCoy, T. Kotwal, S. Sriramulu, B. Barnett</i>	
FAST CHARGING LI-ION BATTERIES.....	497
<i>S. De-Leon</i>	
MODELING THE THERMODYNAMICS AND STATE OF HEALTH OF HIGH-VOLTAGE DOPED LI-MN-BASED SPINEL	498
<i>T. Atwater, J. Douglas, L. Marzocca</i>	
EFFICIENT ON-LINE CONTROL FOR SAFE, FAST CHARGING OF LI-ION BATTERIES.....	502
<i>P. Weddle, T. Vincent, R. Kee</i>	
TWO-MINUTE CHARGER CIRCUITRY DESIGN FOR PORTABLE PHONE.....	506
<i>B. Prather, K. Leitner, R. Prew, H. Hess</i>	
ELECTROCHEMICAL & THERMAL ANALYSIS OF THE THERMAL BATTERY	510
<i>J. Cho, B. Park, J. Kim, S.-H. Ha, C. Im</i>	
FILM COATING OF ELECTRODES FOR HIGH POWER DENSITY THERMAL BATTERIES	514
<i>E. Allcorn, G. Nagasubramanian, B. Montoya, H. Height, C. Apblett, T. Anderson</i>	

IMPROVING THERMAL BATTERY PERFORMANCE THROUGH MODEL-BASED DEVELOPMENT AND IMPROVED COMPONENT DESIGNS.....	518
<i>M. Kenton, D. Bhakta</i>	
IONIC CONDUCTIVITY AND THERMAL STABILITY OF LITHIUM SALT / KF-HF ELECTROLYTES FOR MOLTEN SALT BATTERIES	522
<i>A. Yazdani, M. Sanghadasa, G. Botte</i>	
CARBON MONOFLUORIDE BASED HIGH VOLTAGE THERMAL BATTERY CATHODE	526
<i>B. Perdue, C. Apblett, L. Johnson, E. Allcorn, J. Leonard</i>	
OBSERVATIONS OF THERMAL BEHAVIOR IN A CENTER-FIRED BATTERY AFTER A MISSED HEAT PELLET IGNITION.....	530
<i>E. Piekos, H. Papenguth</i>	
CAM-7®/LTO LITHIUM-ION TECHNOLOGY FOR STRUCTURALLY INTEGRATED VEHICLE BATTERIES	534
<i>D. Ofer, M. Menard, C. McCoy, D. Kaplan, C. Yang, B. Barnett, S. Sriramulu</i>	
CAM-7®/LTO LITHIUM-ION TECHNOLOGY FOR ROBUST, HIGH-POWER VEHICLE BATTERIES	538
<i>D. Ofer, D. Kaplan, C. Yang, S. Dalton-Castor, C. McCoy, T. Kotwal, M. Rutberg, B. Barnett, S. Sriramulu</i>	
SAFE LITHIUM-ION 6T DEVELOPMENT FOR FIGHTING VEHICLES.....	542
<i>J. Perry, K. Paterson, G. Stanton, S. Marker</i>	
SAFT'S XCELION 6T® 28V LITHIUM ION BATTERY FOR MILITARY VEHICLES.....	546
<i>S. Ferguson, K. Hensley</i>	
ADVANCED LEAD ACID – DESIGNING TO STAY COMPETITIVE.....	550
<i>M. Eskra, R. Lafollette, R. Johnson</i>	
LI-ION CONFORMAL WEARABLE BATTERY	554
<i>R. Cragun, C. Buck, S. Khopang, H. Bang, O. Crowther, M. Destephen</i>	
HIGH POWER AND HIGH RATE LI/CF _x MNO ₂ POUCH CELL HYBRID TECHNOLOGY.....	558
<i>E. Ndzebet, M. Destephen, D. Zhang, D. Darch</i>	
PRIMARY CONFORMAL WEARABLE BATTERY.....	561
<i>D. Darch, M. Destephen</i>	
NATO STANDARDIZATION EFFORTS FOR DISMOUNTED SOLDIER POWER.....	565
<i>D. Browning, M. Gietter, D. Milliken</i>	

Author Index