

AABC Tracks 2017

**xEV Battery Technology, Application &
Market and Chemistry & Materials for
Lead-Based Batteries**

Held at AABC 2017

**San Francisco, California, USA
21 - 22 June 2017**

ISBN: 978-1-5108-5012-5

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© (2017) by Cambridge EnerTech
All rights reserved.

Printed by Curran Associates, Inc. (2017)

For permission requests, please contact Cambridge EnerTech
at the address below.

Cambridge EnerTech
Cambridge Innovation institute
250 First Avenue
Suite 300
Needham, MA 02494
USA

Phone: 781-972-5400
Fax: 781-972-5425

ce@cambridgeenertech.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

DEVELOPING AND TESTING NEW LI-ION BATTERY SOLUTIONS USING AN INTEGRATED R&D INFRASTRUCTURE	1
<i>M. Balan, M. Buga, S. Enache, A. Rizoïu, A. Chitu, M. Varlam</i>	
PHEV CELL WITH NANOLYTE™ ELECTROLYTE PASSES NAIL PUNCTURE TEST	3
<i>N. Ball, S. Moganty, G. Torres</i>	
INTERNAL SHORT CIRCUIT DETECTION AND EXAMPLES OF EARLY IMPLEMENTATIONS	4
<i>B. Barnett, C.H. McCoy, S. Sriramulu</i>	
LIFETIME AND CAPACITY RETENTION OF CARBON DECORATED LITHIUM MANGANESE OXIDE POUCH CELLS	6
<i>M. Buga, A. Rizoïu, S. Enache, M. Balan, M. Varlam</i>	
STUDY OF THE EFFECT OF LITHIUM PRECURSOR CHOICE ON PERFORMANCE OF NICKEL-RICH NMC	8
<i>B. Fitch, M. Yakovleva</i>	
HIGH-THROUGHPUT REACTOR MAKES ALD COATINGS ON ANODE AND CATHODE POWDERS COMMERCIALY VIABLE THROUGH ECONOMY OF SCALE	10
<i>B. Flecky, D. King, J. Trevey, P. Lichtu</i>	
12 V AND 48 V LITHIUM-ION-BATTERIES FOR MICRO AND MILD HYBRIDS-INSIGHTS INTO TECHNOLOGICAL CONSIDERATIONS, MARKET OPPORTUNITIES AND CO[2] REDUCTION POTENTIAL	12
<i>D. Gallus, R. Stanek, M. Dehn, B. Leuthner, M. Hackmann</i>	
BEYOND ELECTROCHEMICAL ANALYSIS: 2D, 3D, AND 4D MICROSCOPY OF LIBS	13
<i>J. Gelb, S. Freitag</i>	
NEW WATER-SOLUBLE BINDERS FOR SILICON/GRAPHITE COMPOSITE ELECTRODES IN LITHIUM-ION BATTERIES: "NATTO" BINDER OF POLYGLUTAMATE	14
<i>T. Horiba, T. Mochizuku, S. Aoki, M. Schulz-Dobrick, Z.J. Han, S. Fukuyama, H. Oji, S. Yasuno, S. Komaba</i>	
ENVIRONMENTALLY PHYSICAL SEPARATION AND RECYCLING FOR THE SPENT AUTOMOTIVE LITHIUM-ION BATTERIES	15
<i>C. Ji, Y. Zhao</i>	
SYNTHESIS OF LEAD (PB) NANOPARTICLES ON MESOPOROUS CARBON NANOSTRUCTURE FOR ADVANCED LEAD-ACID BATTERY	17
<i>H.Y. Jung</i>	
PERFORMANCE OF 26650 LI-ION CELLS AT ELEVATED TEMPERATURE UNDER PHEV DRIVE CYCLES	18
<i>A. Kannan</i>	
STRUCTURAL AND ELEMENTAL ANALYSIS OF SULFIDE-BASED ALL-SOLID-STATE BATTERIES VIA ADVANCED MICROSCOPY AND 3-D TOMOGRAPHY TECHNIQUES	19
<i>H. Kim, W.D. Jung, S. Choi, B.N. Yun, M. Park, H.G. Jung, J.H. Lee, H.W. Lee</i>	
HIGH ENERGY ELECTRODES BASED ON NICKEL-RICH MIXED OXIDES: WHAT ARE HIGH OPERATIONAL VOLTAGES GOOD FOR AND HOW DO THEY AFFECT LIFETIME?	20
<i>V. Knoblauch, C. Weisenberger, M. Kleinbach, H. Bruglachner, S. Schebesta, M. Pompetzki</i>	
INVESTIGATION ON CU ADDITIVES AS THE DENDRITE AND CORROSION SUPPRESSOR FOR ZN ANODE IN ZN-AIR BATTERIES	21
<i>Y.S. Lee, K.S. Ryu</i>	
OPTIMIZATION OF CALCINATION CONDITIONS TO ACHIEVE HIGH TAP DENSITY LNI[0.6]MN[0.2]CO[0.2]O[2]	22
<i>I. Abu-Baker, M.J. Murphy, L. Wang, F. Zhou, D. Johnson</i>	
SOLVAY ENLARGED OFFER FOR HIGH VOLTAGE LI-ION BATTERIES	23
<i>T. Mathivet</i>	
INVESTIGATIONS INTO IMPROVING THERMAL STABILITY OF NCM-622 THROUGH ACOUSTICALLY MIXED COATINGS: A COMPARISON OF PARTICLE SIZE AND PROCESSING ON AL[2]O[3] COATINGS	24
<i>M.J. Murphy, A.L. Lipson, A. Hubaud, L. Wang, F. Zhou, D. Johnson</i>	
NOVEL PLATING RECHARGEABLE ALKALI-METAL BATTERIES	25
<i>J.B. Goodenough, M.H. Braga</i>	

APPLICATIONS OF BATTERY CALORIMETRY (ARC) TO CHARACTERIZE THE SAFETY AND PERFORMANCE OF LITHIUM BATTERIES	26
<i>J. Rachford, D. Montgomery</i>	
THERMAL RUNAWAY INITIATION AND PROPAGATION WITHIN XEV BATTERY PACKS	27
<i>D.D. MacNeil, O. Kodra, G. Torlone, G. Lalime, K. Hendershot</i>	
LI[Ni_{0.33}Mn_{0.33}Co_{0.33}O]₂ (NMC) NANOPARTICLES SYNTHESIS AND IMPLEMENTATION OF THE LI-ION BATTERY ELECTRODE BY USING PRINTING PROCESS	29
<i>J. Salomon, D. Peralta, J.F. Colin, F. Fabre, B. Amestoy</i>	
PRESSURE INDUCED IONIC TRANSPORT LIMITATIONS IN POROUS LITHIUM-ION BATTERY MATERIALS	30
<i>D. Sauersteig, R. Bosch</i>	
SPINACH JUICE-DERIVED POROUS FE₂O₃/CARBON NANORODS AS SUPERIOR ANODES FOR LITHIUM-ION BATTERIES	31
<i>Y. Shen, Y. Sun, A. Xie</i>	
DESIGN OF HIGH-PERFORMANCE CELLS FOR PHEV AND START-STOP BATTERIES WITH HIGH-NICKEL CATHODE MATERIAL	32
<i>S. Sriramulu, J. Rempel, D. Ofer, B. Barnett, K. Sahin</i>	
IMPACT OF FAST CHARGING ON NCA CELLS	34
<i>B. Surampudi, I. Smith</i>	
ULTRACAPACITOR/LEAD-ACID HYBRID ENERGY STORAGE	35
<i>S. Werkstetter</i>	
THE HIGHEST ENERGY LI-ION BATTERY - UNLOCKING THE POTENTIAL OF THE SILICON ANODE AND NICKEL-RICH NMC CATHODE	36
<i>E. Williams, D.M. Piper, T. Evans</i>	
XEV EXPANSION, KEY TECHNOLOGY, AND MARKET DEVELOPMENT	37
<i>M. Anderman</i>	
ROUTES TO UNDERSTAND THE IMPACT OF AGGRESSIVE USE CONDITIONS ON BATTERY DURABILITY AND RELIABILITY	52
<i>E. Dufek</i>	
TECHNOLOGY ROADMAP OF BJEV'S BATTERY SYSTEM AND ECOSYSTEM FOR BATTERY REUSING/RECYCLING	59
<i>N/A</i>	
HOW XEV MARKET SHOULD GROW?	73
<i>S. Inagaki</i>	
48V BATTERY MARKET & PRODUCT SOLUTIONS	86
<i>J. Kessen</i>	
ADVANCES IN BATTERY LIFE SIMULATION	94
<i>G.H. Kim</i>	
BATTERY DEVELOPMENT FOR THE PRIUS PRIME (PLUG-IN HYBRID)	103
<i>A. Kiyama, K. Tojima</i>	
XEV INDUSTRY TRENDS OF CHARGING & BATTERY SYSTEMS	114
<i>K.R. Konecky</i>	
MEETING ZEV AND CUSTOMER REQUIREMENTS	126
<i>M. Lord</i>	
THE CONTINUOUSLY EVOLVING STATUS OF THE CHINESE XEV MARKET, AND A STRATEGIC ANALYSIS OF THE TOP BATTERY COMPANIES	140
<i>H.L. Lu</i>	
CALIFORNIA EMISSION REDUCTION TARGETS	149
<i>M. McCarthy</i>	
CUSTOMER USAGE AND DURABILITY OF LI-ION BATTERIES FOR HONDA'S ELECTRICALLY-PROPELLED VEHICLES	155
<i>T. Miyashita, M. Kawamura</i>	
AABC 2017 - LEADING EDGE VEHICLE ELECTRIFICATION	169
<i>A. Oury</i>	
HIGH PERFORMANCE XEV ESS TECHNOLOGY DEVELOPMENT BY JOHNSON MATTHEY BATTERY SYSTEMS	200
<i>A. Paterson</i>	
RELIABILITY OF SK'S BATTERY LIFE PREDICTION: BASED ON EV WITH SK BATTERY	218
<i>N/A</i>	
FORD XEV BATTERY LIFE AND RELIABILITY	227
<i>B. Taenaka</i>	

MODELING OF KEY PARAMETERS FOR CELL LIFE	234
<i>Y. Wei</i>	
SAFE & AFFORDABLE HYBRIDIZATION: TAILORING LEAD ACID BATTERY CHEMISTRY	246
<i>G.C. Beckley</i>	
ROLES OF THE AUXILIARY APPLICATION LEAD ACID BATTERY	259
<i>N/A</i>	
GEOMETRICALLY OPTIMIZED VRLA BATTERY FOR POWER & THERMAL MANAGEMENT	274
<i>G. Brilmyer, M. Gilchrist, T. Coffman</i>	
PHYSICS-BASED MODELING OF NEW THIN-PLATE LEAD-ACID BATTERIES	299
<i>M. Cugnet, J. Lannelongue, A. Kirchev</i>	
COMPARE AND CONTRAST: PB-ACID AND LI-ION BATTERIES	310
<i>L. Gaines, Q. Dai</i>	
HIGH DCA AND LOW WATER CONSUMPTION: ARCACTIVE'S CARBON FIBRE NEGATIVE ELECTRODE	332
<i>S. McKenzie</i>	
MOLECULAR REBAR: DISCRETE CARBON NANOTUBE ADDITIVES FOR AUTOMOTIVE APPLICATIONS	352
<i>J.P. Meyers</i>	
ALABC INNOVATION AND R&D - KEY LEARNINGS FOR FUTURE AUTOMOTIVE APPLICATIONS	362
<i>B. Monahov, A. Davidson</i>	
REENGINEERING LEAD FOR HIGH-POWER AND HIGH DCA	375
<i>D. Moomaw</i>	
NEW CARBON ADDITIVES FOR HIGH DCA AND HIGH TEMPERATURE DURABILITY APPLICATIONS	384
<i>M. Mukai, P. Atanassova, A. DuPasquier, M. Oljaca</i>	
ADVANCED BMS SOLUTIONS FOR AUTOMOTIVE APPLICATIONS WITH ONE MORE LEAD-ACID BATTERIES	397
<i>G. Pilatowicz, O. Metreau, J.F. Mercier, E. Pauchet, J. Danrcr, R. Bos</i>	
GRAPHENE NANOMATERIALS APPLICATION IN LEAD-ACID CHEMISTRY	410
<i>G.P. Dai, L. Wang, R. Privette</i>	
THE FUTURE OF LEAD ACID TECHNOLOGIES IN AUTOMOTIVE APPLICATIONS	421
<i>S. Wood</i>	
Author Index	