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GORDON RESEARCH CONFERENCES *frontiers of science*

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Nancy Ryan Gray, Ph.D.
Director

**2012 GORDON RESEARCH CONFERENCE
on BATTERIES**

FINAL PROGRESS REPORT

DEPARTMENT OF ENERGY
GRANT NO. DE-SC0007414

The Gordon Research Conference on BATTERIES was held at Four Points Sheraton / Holiday Inn Express, Ventura, California, March 4-9, 2012. The Conference was well-attended with 176 participants (attendees list attached). The attendees represented the spectrum of endeavor in this field coming from academia, industry, and government laboratories, both U.S. and foreign scientists, senior researchers, young investigators, and students. Of the 176 attendees, 89 voluntarily responded to a general inquiry regarding ethnicity which appears on our registration forms. Of the 89 respondents, 24% were Minorities – 1% Hispanic, 22% Asian and 1% African American. Approximately 23% of the participants at the 2012 meeting were women.

In designing the formal speakers program, emphasis was placed on current unpublished research and discussion of the future target areas in this field. There was a conscious effort to stimulate lively discussion about the key issues in the field today. Time for formal presentations was limited in the interest of group discussions. In order that more scientists could communicate their most recent results, poster presentation time was scheduled. Attached is a copy of the formal schedule and speaker program and the poster program. In addition to these formal interactions, "free time" was scheduled to allow informal discussions. Such discussions are fostering new collaborations and joint efforts in the field.

Thank you for your support of this Conference. As you know, in the interest of promoting the presentation of unpublished and frontier-breaking research, Gordon Research Conferences does not permit publication of meeting proceedings. If you wish any further details, please feel free to contact me. Thank you.

Sincerely,
Stephen J. Harris, Conference Chairperson
GENERAL MOTORS R & D CENTER

Batteries

Advanced Characterization, Theory and Mechanisms of Processes in Rechargeable Batteries Across Length Scales

March 4-9, 2012

Four Points Sheraton / Holiday Inn Express
Ventura, CA

Chair:

Stephen J. Harris

Vice Chair:

Robert Kostecki

Although performance and durability are critical requirements for advanced batteries if they are to be economically viable, present-day models cannot predict battery life and performance except by extrapolating from experiments on similar battery chemistries and architectures run under similar conditions. This critical situation exists because of the lack of a fundamental understanding of most battery operating and failure mechanisms. For example, except in extreme cases, we have little ability to predict which of the many degradation mechanisms that have been observed or proposed are likely to be operative in any particular environments, especially for the completely new battery chemistries and formats that are now being demonstrated in laboratories. Similarly, whether or not a particular new material performs as hoped can generally be determined only with empirical tests. As a result, designing batteries is a highly empirical process, where the chosen solution is often simply to greatly overdesign the battery, a very expensive approach. A new paradigm is required to design new stable anode and cathode materials to provide electrochemical cells with high voltage, high energy, high power, and long lifetime at a competitive manufacturing cost. Coordinated efforts in fundamental research and advanced engineering are needed to identify new materials, electrode architectures and battery manufacturing technologies for the radical improvements in energy and power densities of chemical energy storage systems.

The ability to address fundamental questions related to advanced electrochemical energy storage devices relies critically on the development and application of novel characterization tools with increased spatial, energy, and temporal resolution. The development of analytical tools that have high sensitivity and cover the wide time scales of processes associated with the battery system operation modes has the potential to revolutionize the field. Theoretical and experimental techniques that can provide fundamental understanding of electron and charge transfer processes and mechanisms by which ions interact with electrode materials, interfacial phenomena are of great interest. Approaches that combine multiple techniques to provide multi-dimensional analysis can reveal the complex, interdependent processes that occur at electrodes, electrolytes, and the interfaces.

Fundamental models that are tackling interface chemistry and intraparticle processes, with transport and mechanics treated at atomic, nanometer, and micrometer scales are also needed. Advanced models that are taking advantage of new microstructural data that are now replacing homogenized models of battery electrodes and separators are of particular interest. These approaches will allow, for the first time, accurate predictions of cell life and performance without appealing to empirical fits. The goal of this Conference is to foster these new

efforts to elucidate fundamental chemical, transport, electrical, and physical processes that can help build and verify improved models to predict battery performance and life, for both conventional Li batteries and for entirely new kinds of rechargeable batteries.

Contributors



SUNDAY

4:00 pm - 8:00 pm	Arrival and Check-in (Office Closed 6:00 pm - 7:45 pm)
6:00 pm	Dinner
7:30 pm - 7:40 pm	Welcome / Introductory Comments by GRC Site Staff
7:40 pm - 9:30 pm	Electrode Materials Discussion Leader: Nancy Dudney (Oak Ridge National Lab)
7:40 pm - 8:20 pm	Gerd Ceder (MIT) "Understanding the limits of phosphate intercalation cathodes: kinetics, safety, and energy density"
8:20 pm - 8:35 pm	Discussion
8:35 pm - 9:15 pm	Jean-Marie Tarascon (Picardie) "Simple tools for the design and preparation of better electrodes materials"
9:15 pm - 9:30 pm	Discussion

MONDAY

7:30 am - 8:30 am	Breakfast
8:30 am	Group Photo
9:00 am - 12:30 pm	Electrode Diagnostics

	Discussion Leader: Dean Wheeler (Brigham Young)
9:00 am - 9:40 am	Petr Novak (Paul Scherer Institute) "In situ Studies of Battery Electrode Materials"
9:40 am - 10:00 am	Discussion
10:00 am	Coffee Break
10:30 am - 11:10 am	Andrew Gewirth (Illinois) "Spectroscopic and Microscopic studies of the SEI and its interaction with metal and semiconductor anodes"
11:10 am - 11:30 am	Discussion
11:30 am - 12:10 pm	Jeff Dahn (Dalhausie) "Advanced Electrochemical Diagnostics to Elucidate Li-ion Cell Degradation Mechanisms"
12:10 pm - 12:30 pm	Discussion
12:30 pm	Lunch
1:30 pm - 4:00 pm	Free Time
4:00 pm - 6:00 pm	<u>Poster Session</u>
6:00 pm	Dinner
7:30 pm - 9:30 pm	Interface Modeling
	Discussion Leader: Rick Muller (Sandia National Lab)
7:30 pm - 8:10 pm	Oleg Borodin (Electrochemistry Branch, Army Research Laboratory, Adelphi, MD) "Insight into Electrolyte Stability and Transport from Simulations"
8:10 pm - 8:30 pm	Discussion
8:30 pm - 9:10 pm	Yue Qi (General Motors) "How Li Transports Through the Solid Electrolyte Interphase"
9:10 pm - 9:30 pm	Discussion

TUESDAY

7:30 am - 8:30 am	Breakfast
9:00 am - 12:30 pm	Local Structure Diagnostics
	Discussion Leader: Chris Johnson (Argonne National Lab)
9:00 am - 9:40 am	Sergei Kalinin (Oak Ridge National Lab) "Electrochemical Strain Microscopy: Nanometer-scale view of Li-Ion Batteries and Fuel Cells"
9:40 am - 10:00 am	Discussion
10:00 am	Coffee Break
10:30 am - 11:10 am	Clare Grey (Cambridge) "Probing local structure and dynamics in lithium ion batteries with new <i>in situ</i> methods"
11:10 am - 11:30 am	Discussion

11:30 am - 12:10 pm	Nigel Brandon (Imperial) "Characterizing battery microstructure in three dimensions at a range of length scales"
12:10 pm - 12:30 pm	Discussion
12:30 pm	Lunch
1:30 pm - 4:00 pm	Free Time
4:00 pm - 6:00 pm	<u>Poster Session</u>
6:00 pm	Dinner
7:30 pm - 9:30 pm	Kinetics and Dynamics Discussion Leader: Bob Kee (Colorado School of Mines)
7:30 pm - 8:10 pm	Anton Van der Ven (Michigan) "Predicting Kinetic Properties of Electrodes from First Principles"
8:10 pm - 8:30 pm	Discussion
8:30 pm - 9:10 pm	Edwin Garcia (Purdue) "3D Simulation, Analysis, and Design of Rechargeable Li-Ion Battery Microstructures"
9:10 pm - 9:30 pm	Discussion

WEDNESDAY

7:30 am - 8:30 am	Breakfast
9:00 am - 12:30 pm	Microstructure Discussion Leader: Xingcheng Xiao (General Motors)
9:00 am - 9:40 am	Hong Li (Chinese Academy of Sciences) "Structure evolution of high capacity electrodes for Li-ion batteries"
9:40 am - 10:00 am	Discussion
10:00 am	Coffee Break
10:30 am - 11:10 am	Ryoji Kanno (Kyoto) "Structural studies on electrode/electrolyte interface"
11:10 am - 11:30 am	Discussion
11:30 am - 12:10 pm	Joachim Maier (Max Planck) "Size Effects on Storage in Li-based Batteries"
12:10 pm - 12:30 pm	Discussion
12:30 pm	Lunch
1:30 pm - 4:00 pm	Free Time
4:00 pm - 6:00 pm	<u>Poster Session</u>
6:00 pm	Dinner
7:00 pm - 7:30 pm	<u>Business Meeting</u> <i>Nominations for the next Vice Chair; Fill out Conference Evaluation Forms; Discuss future Site & Scheduling preferences; Election of the next</i>

Vice Chair

7:30 pm - 9:30 pm	SEI Chemistry
	Discussion Leader: Kristina Edstrom (Uppsala)
7:30 pm - 8:10 pm	Kevin Leung (Sandia National Lab) "Modeling initial stages of SEI formation on anode, oxide-coated anode, and manganese dioxide cathode surfaces"
8:10 pm - 8:30 pm	Discussion
8:30 pm - 9:10 pm	Ken Tasaki (Mitsubishi Chemical) "New Insight into Cycling Characteristics of Li-Ion Battery Cells in a Variety of Electrolytes"
9:10 pm - 9:30 pm	Discussion

THURSDAY

7:30 am - 8:30 am	Breakfast
9:00 am - 12:30 pm	Beyond Traditional Li-Ion Batteries
	Discussion Leader: Venkat Srinivasan (Lawrence Berkeley National Lab)
9:00 am - 9:40 am	Yet-Ming Chiang (MIT) "New Device Architectures"
9:40 am - 10:00 am	Discussion
10:00 am	Coffee Break
10:30 am - 11:10 am	Doron Aurbach (Bar Ilan) "Rechargeable Mg batteries: status report"
11:10 am - 11:30 am	Discussion
11:30 am - 12:10 pm	Yang Shao-Horn (MIT) "O ₂ Electrocatalysis for Rechargeable Metal-Air Batteries: Challenges and Opportunities"
12:10 pm - 12:30 pm	Discussion
12:30 pm	Lunch
1:30 pm - 4:00 pm	Free Time
4:00 pm - 6:00 pm	<u>Poster Session</u>
6:00 pm	Dinner
7:30 pm - 9:30 pm	Properties and Performance at the Electrode-Electrolyte Interface
	Discussion Leader: Ping Liu (Hughes Research Lab)
7:30 pm - 8:10 pm	Anne Dillon (National Renewable Energy Lab) "Enabling Durable High Rate Capability for High Capacity Li-Ion Electrodes"
8:10 pm - 8:30 pm	Discussion
8:30 pm - 9:10 pm	Kang Xu (Army Research Lab)

"Interfacing Electrolytes with Electrodes in Li Ion Batteries"

9:10 pm - 9:30 pm Discussion

FRIDAY

7:30 am - 8:30 am Breakfast

9:00 am Departure

Batteries (2012)

Name	Organization	Participation	Status
ABRAHAM, DANIEL P	ARGONNE NATIONAL LABORATORY	Attendee	Registered
ALBERTUS, PAUL S	ROBERT BOSCH RESEARCH AND TECHNOLOGY CENTER	Poster Presenter	Registered
ANDREWS, JOY C	STANFORD SYNCHROTRON RADIATION LIGHTSOURCE	Poster Presenter	Registered
ARAI, HAJIME	KYOTO UNIVERSITY	Poster Presenter	Registered
AURBACH, DORON	BAR ILAN UNIVERSITY	Speaker	Registered
BALKE, NINA	OAK RIDGE NATIONAL LABORATORY	Poster Presenter	Registered
BAN, CHUNMEI	NATIONAL RENEWABLE ENERGY LAB	Poster Presenter	Registered
BARNETT, SCOTT A	NORTHWESTERN UNIVERSITY	Poster Presenter	Registered
BECK, LARRY W	A123 SYSTEMS	Poster Presenter	Registered
BEHM, MARTEN	KTH ROYAL INSTITUTE OF TECHNOLOGY	Poster Presenter	Registered
BOESENBERG, ULRIKE	LAWRENCE BERKELEY NATIONAL LABORATORY	Poster Presenter	Registered
BONNICK, PATRICK	DALHOUSIE UNIVERSITY	Poster Presenter	Registered
BORODIN, OLEG	ARMY RESEARCH LABORATORY	Speaker	Registered
BRANDON, NIGEL	IMPERIAL COLLEGE	Speaker	Registered
BURNS, JOHN C	DALHOUSIE UNIVERSITY	Poster Presenter	Registered
CABANA, JORDI	LAWRENCE BERKELEY NATIONAL LABORATORY	Poster Presenter	Registered
CEDER, GERBRAND	MIT	Speaker	Registered
CHAN, CANDACE K	ARIZONA STATE UNIVERSITY	Attendee	Registered
CHAPMAN, KARENA W	ARGONNE NATIONAL LABORATORY	Poster Presenter	Registered
CHEN, GUOYING	LAWRENCE BERKELEY NATIONAL LAB	Poster Presenter	Registered
CHEN, ZHONGWEI	UNIVERSITY OF WATERLOO	Poster Presenter	Registered
CHEN, ZONGHAI	ARGONNE NATIONAL LABORATORY	Poster Presenter	Registered
CHENG, YANG-TSE	UNIVERSITY OF KENTUCKY	Discussion Leader	Registered
CHI, MIAOFANG	OAK RIDGE NATIONAL LABORATORY	Poster Presenter	Registered
CHIANG, YET-MING	MIT	Speaker	Registered
CHO, HYUNG MAN	UCSD	Poster Presenter	Registered
CHON, MICHAEL	BROWN UNIVERSITY	Poster Presenter	Registered
CHRISTENSEN, JAKE	ROBERT BOSCH LLC	Attendee	Registered
CHRISTIANSEN, ANE	DTU	Poster Presenter	Registered
CHUNG, DING-WEN	PURDUE UNIVERSITY	Poster Presenter	Registered
Cid, Clement	California Institute of Technology	Attendee	Registered
DAHN, JEFF R	DALHOUSIE UNIVERSITY	Speaker	Registered
DELACOURT, CHARLES	LAWRENCE BERKELEY NATIONAL LAB	Poster Presenter	Registered
DEPPE, JACK B	DEPPE CONSULTING LLC	Attendee	Registered
DESHPANDE, RUTOOJ D	LAWRENCE BERKELEY NATIONAL LABORATORY	Poster Presenter	Registered
DIKAREV, EVGENY V	STATE UNIVERSITY OF NEW YORK AT ALBANY	Poster Presenter	Registered
DILLON, ANNE C	NATIONAL RENEWABLE ENERGY LAB	Speaker	Registered
DUDNEY, NANCY	OAK RIDGE NATIONAL LABORATORY	Discussion Leader	Registered
DURA, JOSEPH A	NIST CENTER FOR NEUTRON RESEARCH	Poster Presenter	Registered
EBNER, MARTIN	ETH ZURICH	Poster Presenter	Registered

EDSTROM , KRISTINA	UPPSALA UNIVERSITY	Discussion Leader	Registered
ELY, DAVID R	PURDUE UNIVERSITY	Poster Presenter	Registered
ENDO, EISHI	SONY CORP	Poster Presenter	Registered
FAN, FEIFEI	GEORGIA INSTITUTE OF TECHNOLOGY	Poster Presenter	Registered
FENTER, PAUL A	ARGONNE NATIONAL LABORATORY	Attendee	Registered
FERGUSON, TODD R	MIT	Poster Presenter	Registered
FISTER, TIM T	CHEMICAL SCIENCES & ENGINEERING, ARGONNE NATL LAB	Poster Presenter	Registered
FULLERTON, SUSAN K	UNIVERSITY OF NOTRE DAME	Poster Presenter	Registered
GARCIA, EDWIN	PURDUE UNIVERSITY	Speaker	Registered
GELDMACHER, FELIX	ETH ZURICH	Poster Presenter	Registered
GEWIRTH, ANDREW A	UNIVERSITY OF ILLINOIS	Speaker	Registered
GORDON, JOSEPH G	APPLIED MATERIALS	Attendee	Registered
GREGORCZYK, KEITH E	UNIVERSITY OF MARYLAND	Poster Presenter	Registered
GREY, CLARE P	STONY BROOK UNIVERSITY	Speaker	Registered
GROSS, AXEL	ULM UNIVERSITY	Attendee	Registered
GUDURU, PRADEEP R	BROWN UNIVERSITY	Attendee	Registered
HAMERS, ROBERT J	UNIV. OF WISCONSIN-MADISON AND SILATRONIX, INC.	Poster Presenter	Registered
HARRIS, STEPHEN J.	GENERAL MOTORS R & D CENTER	Chair	Registered
HELLRING, STUART D	PPG INDUSTRIES, INC.	Attendee	Registered
HELMS, BRETT A	LAWRENCE BERKELEY NATIONAL LABORATORY	Poster Presenter	Registered
HORSTMANN, BIRGER CH	GERMAN AEROSPACE CENTER	Poster Presenter	Registered
HUANG, JIANYU	SANDIA NATIONAL LABORATORIES	Poster Presenter	Registered
IDROBO, JUAN C	OAK RIDGE NATIONAL LABORATORY	Poster Presenter	Registered
JIANG, DE-EN	OAK RIDGE NATIONAL LABORATORY	Poster Presenter	Registered
JIANG, MENG	GENERAL MOTORS	Attendee	Registered
JIAO, FENG	UNIVERSITY OF DELAWARE	Poster Presenter	Registered
JOHNSON, CHRISTOPHER S	ARGONNE NATIONAL LABORATORY	Poster Presenter	Registered
KALININ, SERGEI V	OAK RIDGE NATIONAL LAB	Speaker	Registered
KANNO, RYOJI	TOKYO INSTITUTE OF TECHNOLOGY	Speaker	Registered
KEE, ROBERT	COLORADO SCHOOL OF MINES	Discussion Leader	Registered
KIM, JANG-KYO	HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY	Poster Presenter	Registered
KNIGHT, CHRISTOPHER J	ARGONNE NATIONAL LABORATORY	Poster Presenter	Registered
KOLLER, HUBERT	UNIVERSITY OF MUENSTER	Attendee	Registered
KOSTECKI, ROBERT	LAWRENCE BERKELEY NATIONAL LABS	Vice Chair	Registered
KRINS, NATACHA	LAWRENCE BERKELEY NATIONAL LABORATORY	Poster Presenter	Registered
KUMAR, REVATI	UNIVERSITY OF CHICAGO	Poster Presenter	Registered
LEE, JINWOO	POHANG UNIVERSITY OF SCIENCE AND TECHNOLOGY	Poster Presenter	Registered
LEE, JONG-SOOK	CHONNAM NATIONAL UNIVERSITY	Poster Presenter	Registered
LEE, MYONGJAI	DOW KOKAM	Attendee	Registered
LESKES, MICHAL	UNIVERSITY OF CAMBRIDGE	Poster Presenter	Registered

LEUNG, KEVIN	SANDIA NATIONAL LAB	Speaker	Registered
LI, ZHE	UNIVERSITY OF UTAH	Poster Presenter	Registered
LI, HONG	INSTITUTE OF PHYSICS, CHINESE ACADEMY OF SCIENCES	Speaker	Registered
LIU, JING	UNIVERSITY OF MICHIGAN	Poster Presenter	Registered
LIU, DAWEI	BROWN UNIVERSITY	Poster Presenter	Registered
LIU, PING	HUGHES RESEARCH LABS	Discussion Leader	Registered
LU, PENG	GENERAL MOTORS R&D CENTER	Poster Presenter	Registered
LU, YI-CHUN	MIT	Speaker	Registered
LUX, SIMON F	LAWRENCE BERKELEY NATIONAL LABORATORY	Poster Presenter	Registered
MAIER, JOACHIM	MAX-PLANCK-INSTITUT FUR FESTKORPERFORSCHUNG	Speaker	Registered
MCCARTY, KEVIN	SANDIA NATIONAL LABORATORIES	Attendee	Registered
MCGILVRAY, THOMAS	UC SAN DIEGO	Poster Presenter	Registered
MICHALAK, WILLIAM D	LAWRENCE BERKELEY NATIONAL LABORATORY	Attendee	Registered
MILLER, DEAN J	ARGONNE NATIONAL LABORATORY	Poster Presenter	Registered
MILLIRON, DELIA J	LAWRENCE BERKELEY NATIONAL LABORATORY	Poster Presenter	Registered
MISSERT, NANCY	SANDIA NATIONAL LABORATORIES	Poster Presenter	Registered
MONROE, CHARLES W	UNIVERSITY OF MICHIGAN	Poster Presenter	Registered
MOORE, C. BRADLEY	UNIVERSITY OF CALIFORNIA BERKELEY	Attendee	Registered
MUKHERJEE, PARTHA	TEXAS A&M UNIVERSITY	Attendee	Registered
MUKHOPADHYAY, AMARTYA	INDIAN INSTITUTE OF TECHNOLOGY (IIT) BOMBAY	Poster Presenter	Registered
MULLER, RICHARD	SANDIA NATIONAL LABS	Discussion Leader	Registered
NEUHOLD, SUSANNA	ARGONNE NATIONAL LABORATORY	Poster Presenter	Registered
NGOEPE, PHUTI E	UNIVERSITY OF LIMPOPO	Poster Presenter	Registered
NORBERG, NICK S	LAWRENCE BERKELEY NATIONAL LAB	Poster Presenter	Registered
NOVAK, PETR	PAUL SCHERRER INSTITUTE	Speaker	Registered
OGLETREE, D. FRANK	LAWRENCE BERKELEY NATIONAL LAB	Attendee	Registered
OHSAWA, YASUHIKO	NISSAN MOTOR CO., LTD.	Poster Presenter	Registered
OWEJAN, JEANETTE E	GENERAL MOTORS EERL	Poster Presenter	Registered
OYAMA, NOBORU	TOKYO UNIVERCITY OF AGRICULTURE AND TECHNOLOGY	Poster Presenter	Registered
PARK, SEUNGWON	KYOTO UNIVERSITY	Poster Presenter	Registered
PARKER, JOSEPH F	UNITED STATES NAVAL RESEARCH LABORATORY	Poster Presenter	Registered
PATTERSON, MARY L	ENERDEL	Attendee	Registered
PERSSON, KRISTIN A	LBNL	Poster Presenter	Registered
PHARR V, GEORGE M	HARVARD UNIVERSITY	Poster Presenter	Registered
PREDITH, ASHLEY	NEES ENERGY FRONTIER RESEARCH CENTER	Poster Presenter	Registered
PRENDERGAST, DAVID G	LAWRENCE BERKELEY NATIONAL LABORATORY	Poster Presenter	Registered
QI, YUE L.	GENERAL MOTORS R&D CENTER	Speaker	Registered
QIAN, DANNA	UNIVERSITY OF CALIFORNIA, SAN DIEGO	Poster Presenter	Registered
RICHARDSON, THOMAS	LAWRENCE BERKELEY NATIONAL LABORATORY	Poster Presenter	Registered
RIVEST, JESSY B	LAWRENCE BERKELEY NATIONAL LABORATORY	Poster Presenter	Registered

ROUMI, FARSHID	CALIFORNIA INSTITUTE OF TECHNOLOGY	Poster Presenter	Registered
RUBLOFF, GARY W	UNIVERSITY OF MARYLAND	Poster Presenter	Registered
SASAKI, TSUYOSHI	PAUL SCHERRER INSTITUT	Poster Presenter	Registered
SAUTER, ULRICH S.	ROBERT BOSCH GMBH	Attendee	Registered
SAYKALLY, RICHARD J	UNIVERSITY OF CALIFORNIA, BERKELEY	Attendee	Registered
SCHAEFER, JENNIFER L	CORNELL UNIVERSITY	Poster Presenter	Registered
SCHMID, MATTHIAS	KIT (KARLSRUHE INSTITUTE OF TECHNOLOGY)	Poster Presenter	Registered
SCHUCK, P JAMES	LAWRENCE BERKELEY NATIONAL LABORATORY	Poster Presenter	Registered
SEE, KIMBERLY A	UNIVERSITY OF CALIFORNIA, SANTA BARBARA	Poster Presenter	Registered
SHAO, YUYAN	PACIFIC NORTHWEST NATIONAL LABORATORY	Poster Presenter	Registered
SHEARING, PAUL R	UNIVERSITY COLLEGE LONDON	Poster Presenter	Registered
SHELDON, BRIAN W	BROWN UNIVERSITY	Poster Presenter	Registered
SHI, ZHONG	BASF CORPORATION	Poster Presenter	Registered
SIEGEL, JASON B	UNIVERSITY OF MICHIGAN	Poster Presenter	Registered
SINHA, NUPUR NIKKAN	DALHOSUIE UNIVESITY	Poster Presenter	Registered
SLATER, MICHAEL D	ARGONNE NATIONAL LABORATORY	Poster Presenter	Registered
SPOTNITZ, ROBERT	BATTERY DESIGN LLC	Poster Presenter	Registered
STEFANOPOULOU, ANNA	UNIVERSITY OF MICHIGAN	Poster Presenter	Registered
STRAND, DEIDRE A	DOW CHEMICAL	Attendee	Registered
STROBRIDGE, FIONA C	UNIVERSITY OF CAMBRIDGE	Poster Presenter	Registered
SULLIVAN, JOHN P	SANDIA NATIONAL LABORATORIES	Poster Presenter	Registered
SUN, KE	UNIVERSITY OF ILLINOIS	Poster Presenter	Registered
TANG, MAUREEN H	UC BERKELEY	Poster Presenter	Registered
TANG, KUN	MAX PLANCK INSTITUTE FOR SOLID STATE RESEARCH	Poster Presenter	Registered
TARASCON, JEAN MARIE	UNIVERSITY OF PICARDIE	Speaker	Registered
TASAKI, KEN	mitsubishi chemical holdings america	Speaker	Registered
TENHAEFF, WYATT E	OAK RIDGE NATIONAL LABORATORY	Poster Presenter	Registered
THIELE, SIMON	UNIVERSITY OF FREIBURG	Poster Presenter	Registered
TIMMONS, ADAM T	CHRYSLER	Poster Presenter	Registered
TOKRANOV, ANTON V	BROWN UNIVERSITY	Poster Presenter	Registered
TURNER, JOHN A.	OAK RIDGE NATIONAL LAB / UT-BATTELLE	Poster Presenter	Registered
UNOCIC, RAYMOND R	OAK RIDGE NATIONAL LABORATORY	Poster Presenter	Registered
URBAN, JEFFREY J	LAWRENCE BERKELEY NATIONAL LAB, THE MOLECULAR FOUN	Poster Presenter	Registered
VAN DER VEN, ANTON	UNIVERSITY OF MICHIGAN	Speaker	Registered
VOLKOV, ALEKSEI	BASF SE	Attendee	Registered
WANG, RUI	CHINESE ACADEMY OF SCIENCES	Poster Presenter	Registered
WANG, YUNBO YW	PURDUE UNIVERSITY	Poster Presenter	Registered
WANG, FENG	BROOKHAVEN NATIONAL LABORATORY	Poster Presenter	Registered
WANG, CHAO	ARGONNE NATIONAL LABORATORY	Poster Presenter	Registered
WANG, HOWARD	STATE UNIVERSITY OF NEW YORK, BINGHAMTON	Poster Presenter	Registered
WASER, OLIVER	ETH ZURICH, PARTICLE TECHNOLOGY LABORATORY (PTL)	Poster Presenter	Registered
WHEELER, DEAN	BRIGHAM YOUNG UNIVERSITY	Discussion Leader	Registered

WILSON, LANE	U.S. DEPARTMENT OF ENERGY	Attendee	Registered
WINARSKI, ROBERT P	ARGONNE NATIONAL LABORATORY	Poster Presenter	Registered
WOOD, VANESSA C	ETH ZURICH	Attendee	Registered
WOODFORD, WILLIAM H	MIT	Poster Presenter	Registered
XIAO, XINGCHENG	GENERAL MOTORS R&D CENTER	Discussion Leader	Registered
XU, LINPING	LAWRENCE BERKELEY NATIONAL LAB	Poster Presenter	Registered
XU, KANG	US ARMY RESEARCH LAB	Speaker	Registered
YANG, JUDITH C	UNIVERSITY OF PITTSBURGH	Attendee	Registered
YANG, WANLI	LAWRENCE BERKELEY NATIONAL LAB	Poster Presenter	Registered
YILDIRIM, HANDAN	ARGONNE NATIONAL LABORATORY	Poster Presenter	Registered
YOON, WON-SUB	SUNGKYUNKWAN UNIVERSITY	Poster Presenter	Registered
ZEB, GUL	MCGILL UNIVERSITY	Poster Presenter	Registered
ZHU, LIKUN	INDIANA UNIVERSITY PURDUE UNIVERSITY INDIANAPOLIS	Poster Presenter	Registered
ZHU, TING	GEORGIA INSTITUTE OF TECHNOLOGY	Poster Presenter	Registered
176 Attendees			