Speaker Abstract

(1.2) Sino-German Cooperation E-Mobility in China

Author
Name: WANG Cheng
Title: Deputy Director
Institution: China Automotive Technology & Research Center (CATARC)
Country: P.R. China
Email: wang_ch@126.com

Summary:
The development of new energy vehicles (NEV) is a strategy measure of China to realize the sustainable automobile industry. Since the project of “Promoting NEVs in 10 cities, 1,000 units in each city” in 2009, China has issued supporting policies to promote the NEV industrialization. Various financial and tax incentive policies, as well as non-financial incentive measures were provided, which successfully helped the NEV market introduction. For example, there were the policies of “The notice of further conducting the pilot demonstration and promotion of energy saving and new energy vehcles” and the “Temporary reguations on providing pilot financial subsidies for private users who purchase NEVs”. The NEV products can get preferential taxes such as vehicle and vessel tax, and vehicle purchase tax. Besides, China supported the NEV scientific and research resources and funding through science and technology plannings and projects, including the special key projects of EVs, the important projects of energy saving and new energy vehicles, and the technical innovation projects of NEV industry. Because the charging infrastructure is essential for NEV development, China issued several policies to support charging infrastructure construction and operation. With the national supporting policies system, the NEV demonstration cities also issued related local supporting pocilies to promote NEVs.

Space for notes:

Speaker Abstract

(1.3) Policy overview for e-mobility promotion in Hamburg

Author
Name: Michael Richter
Title: Head of Division Innovation, Technology, Cluster
Institution: Ministry of Economy, Transport and Innovation,
Free and Hanseatic City of Hamburg
Country: Germany

Summary:
For several years now, Hamburg operates successfully the development of electric mobility. Both in the number of battery-electric vehicles as well as the network of public accessible charging infrastructure, Hamburg is one of Germany's pioneers. According to the plans of the Federal Government, Germany is supposed to become the lead market and lead supplier for electric mobility. As innovation driver, electric mobility encourages the implementation of a new mobility culture, such as in public transport (especially via emission-free buses) or in covering short distances as part of intermodal concepts and offers the potential to handle urban traffic on the whole more climate-friendly, cleaner and quieter. Beyond this, electric vehicles, as in industrial or municipal fleets, are making a significant contribution to achieve air pollution targets, to reduce the dependence on fossil fuels and therefore CO2 emissions, and thus improving the quality of life in the urban area. Last but not least, a systematic integration of electric mobility in the planning concepts of urban and neighborhood developments offers the basis for a sustainable development of the city. Hamburg is known as strongly demand-oriented and, as an early market, provides a complementary approach to the various "Schaufenster Elektromobilität" which focus on the automotive industry locations. With the "Masterplan Charging Infrastructure", adopted by the Hamburg Senate in 2014 and now being implemented, Hamburg creates the basis for a demand-oriented and balanced relationship between publicaccessible charging infrastructure and the successive rising EV traffic volumes. The important cornerstones of the masterplan concept are an open market access for all interested operators, the offer of a wide, user-friendly access and a funding program for installations on private-commercial areas.

Space for notes:

Speaker Abstract

(1.4) The progress report of the demonstration and promotion of new energy vehicles in Hamburg & Shenzhen

Author
Name: LU Xiangzhen
Title: Director
Institution: The Development and Reform Commission of Shenzhen Municipality
Country: P.R. China
Email: 957897035@qq.com

Summary:
Since confirmed by MOST as a new energy vehicle demonstration and promotion partner with Hamburg in 2011, Shenzhen carried out a series of exchange activities with Hamburg. Both sides identified to develop exchanges and cooperation on three aspects, charging facilities planning, airport mobile equipment electrification, and cooperation of institutions. As of June 30, 2016, Shenzhen has accumulated to promote 51929 new energy vehicles, built 23429 charging piles. Shenzhen encourage the social forces on the construction and operation of new energy vehicles as well as their facilities, especially to make promotional breakthrough on the public service area as pure electric buses and logistics vehicles. The charging stations construction are based on drivers comvinience with service radius as high as 0.85 km in downtown area. The airport shuttle trials are operated both in Shenzhen and Xiamen airport. The institutional co-operation got significant progress, the cross disciplinary collaborative platform will benifit Shenzhen's industrial development as well.

Space for notes:

Speaker Abstract

(2.2a) Optimization of the charging station location for electric buses

Author
Name: ZHANG Kai
Title: Associate Professor
Institution: Graduate School at Shenzhen, Tsinghua University
Country: P.R. China

Co-Authors: Dr. ZHOU Zhe, Tshinghua-Berkeley Shenzhen Institute, China;
Associate Professor LI Zhiheng, Graduate School at Shenzhen, Tsinghua University, China

Summary:

Optimal planning of electric-bus charging stations is of great significance in the electrification of public transportation. Buses run on schedule and have high dependency on the reliability of power supply. Therefore, a multi-objective electric-bus charging station allocation model is established considering both electrical distribution and traffic network.

The bi-level model first considers the capturing traffic flow along bus lines and infrastructure investment in the traffic network and selects several feasible schemes by simulated annealing (SA) algorithm. Next, in the distribution network, the minimization of network losses and voltage deviation are taken as the objectives to obtain the optimal scheme without violating the voltage and power flow constraints. The bi-level planning model solves the coupled optimization of traffic and power system, and is capable of designing the emergency operation schedule. Finally, on the basis of a 14-node distribution network and 12-node traffic network, the effectiveness of the model is tested.

Space for notes:

Speaker Abstract

(2.2a) „Finding the right location" - The development of a demand-oriented model to identify optimal locations for public e-charging infrastructure at the example of Hamburg

Author
Name: Christian Scheler
Title: M.Sc., mobility consultant
Institution: ARGUS - city and traffic planning
Country: Germany

Summary:
The electrification of cars is a new challenge for the "fuel" infrastructure in cities. To just rely on the loading infrastructure in private parking spaces or on petrol stations won't be successful. To support a successful establishment of e-mobility in cities it is important to understand the user demands connected to the different charging times. Even though a public loading infrastructure might not be necessary for most of driving patterns. A visible loading infrastructure could help to bridge the mental barrier of e-mobility by offering a possible range increase and hereby just a saver feeling driving a e-car. Furthermore, a well located public loading infrastructure is necessary to allow the electrification of free-floating car-sharing systems, such as car2go or DriveNow.

The Masterplan Infrastructure points determents almost 600 additional charging points in Hamburg. In order to find the optimal locations, ARGUS was assigned to develop a location model in collaboration with the "Department of Economics, Traffic and Innovation" for the City of Hamburg and hySolutions.

According to current research, different aspects such as the residential and commercial density, the connection with public transport and the proximity to points of interest are taken into account. More than 8 factors are translated into a geographic information system that emits a map of the urban structure with its individual characteristics. Subsequently, the elevated potential locations are reviewed with a political perspective. As a last step, the locations are visited locally by experts from ARGUS so that the urban and traffic situation can be analyzed and the parking area can be measured and documented.

This location model allows to understand the predicted demand connected urban structure of the city apart from individual prejudice. Above that it gives a clear political argumentation for infrastructure placement and investment. In view of the availability of open data this location model is easily conferrable to other cities and can also be used to find suitable locations for other mobility services by adjusting the considered aspects.

Space for notes:

Speaker Abstract

(2.2b) Introduction to the promotion of new energy vehicles in Dalian

Author
Name: MA Chunyan
Title: Section Chief
Institution: The Leading Group Office of Energy Saving and New Energy Vehicles Demonstration Project in Dalian
Country: P.R. China

Co-Author: LI Weibin, Section Chief, The Leading Group Office of Energy Saving and New Energy Vehicles Demonstration Project in Dalian, P.R. China.

Summary:
Dalian, is one of 39 cities (regions) of new energy vehicles promotion from 2013 to 2015 in China. To arouse the enthusiasm of buying and using new energy vehicles, Dalian has taken measures to subsidize NEV buyers and not to perform traffic restriction. From 2013 to 2015, the city promotes more than 5200 new energy vehicles in the fields of buses, leasing, taxis and logistics. And 44 charging stations, 160 fast-charging piles and 2320 ordinary charging piles have been built at the same time. Dalian took the lead in proposing the goal of electric bus in the country and had 1700 new-energy buses with the construction of 26 charging stations. The leasing of NEV is also the key to the promotion of NEV in Dalian. There are more than 2600 new energy vehicles for the purpose of shuttle buses, tourist transportation, time sharing leasing, coaches and passenger cars. The shuttle bus leasing is the most popular one and it has more than 1700 cars with 15 charging stations and more than 300 fast-charging piles.

Space for notes:

Speaker Abstract

(2.2b) Overview Model Region E-Mobility RHINE-RUHR

Author
Name: Stefan Garche
Title: Lawyer
Institution: EE ENERGY ENGINEERS GmbH (Ener-gyAgency.NRW)
Country: Germany
Email: garche@energieagentur.nrw

Co-Author: Georg Grothues, head of regional project office model region Rhine-Ruhr, EE ENERGY ENGINNERS GmbH, grothues@energy-engineers.de

Summary:
Model Region for electromobility Rhine-Ruhr started 2009. Meanwhile 43 projects have been coordinated by the regional project office since 2009. A total budget of more than 53 Mio. EUR (with a funding budget of more than 33 Mio. EUR) cover 90 project partner. Over 900 vehicles are planned in total and more than 440 are already in use. Around 1.000 charging points were planned and appr. 400 are installed.

The focus is on commercial and municipal fleets, public transport (intermodality), development of business models, international cooperations and integration of renewable energies. During the presentation the targets of each project as well as some results will be presented. Also an outlook for the planned next phase until 2019 will be given.

Space for notes:

Speaker Abstract

(2.2b) New Energy Vehicles and Charging Infrastructure - Policies, Instruments and Development in Wuhan

Author
Name: GUO Liang
Title: General Manager
Institution: Wuhan Electric Vehicle Demonstration Co., Ltd
Country: P.R. China
Email: 463909836@qq.com

Summary:

Wuhan is the biggest city in middle of China, gathering fourteen vehicles brands, six automobile factories. In 2003, it started "national electric vehicles demonstration city". In 2009, the national "ten cities thousand vehicles" launched in Wuhan.

At present, the number of Wuhan New Energy Vehicles (NEV) has amounted to 15,567, and construction and running of total 4,982 charging piles. From 2013 to the first half of 2016,Wuhan adopted 29 NEV brands at home and abroad and 85 kinds of models. Vehicle type is mainly divided into pure electric vehicles and hybrid power vehicles. Wuhan NEV application areas include seven areas, such as bus, taxi, public, sanitation, logistics, commuting and social vehicles.

We have builded the first batch of NEV safety monitoring data centre in China, setting up charging alliance about city service and promoting interconnectivity about charging infrastructure. We are constructing public service management platform of city car- sharing, from network platform, ground platform and service platform, and providing a unified and standardized service to operators, government, vehicles enterprises and citizens. The data of all operators in the platform has shared resource of parking and charging pile because of interconnectivity.

In 2010, we signed a cooperation agreement with Nissan Corporation. As the first pilot city of Nissan LEAF pure electric vehicles, we have achieved the demonstration application, and have realized its production in China. In 2010, as the first pilot city of a Sino-German electric vehicles cooperation project, we have explored NEV marketing experience and data to exchange. The cooperation agreement of third period signed in 2015.

Space for notes:

Speaker Abstract

(3.1) Smart e-mobility solutions for residential areas in Hamburg - e-Quartier Hamburg - experiences

Author (1)
Name: Daniel Kulus
Title: Dipl.-Ing.
Institution: HafenCity University Hamburg
Country: Germany
Email: daniel.kulus@hcu-hamburg.de

Co-Author: Prof. Dr.-Ing. Wolfgang Dickhaut, HafenCity University Hamburg (HCU), Germany, Wolfgang.dickhaut@hcu-hamburg.de

Author (2)
Name: Thomas Prill
Title: Dr. Phil.
Institution: HafenCity University Hamburg
Country: Germany
Email: thomas.prill@hcu-hamburg.de

Co-Author: Prof. Dr.-Ing. Wolfgang Dickhaut, HafenCity University Hamburg (HCU), Germany, Wolfgang.dickhaut@hcu-hamburg.de

Summary:

Facing the increasing traffic load, innovative mobility concepts are needed to improve the quality of life in residential areas. The goals of the transformation process are traffic avoidance and environmentally friendly transportation systems with renewable energy sources. There are two important solutions for the climate- and city-friendly mobility: car sharing and electromobility. On the long term, car sharing can influence the mobility behavior and help to reduce the number of vehicles in the streets, what makes a city more liveable. "e-Quartier Hamburg" is a project funded by the BMVI (Federal Ministry of Transport and Digital Infrastructure) as a part of the program "Modellregionen für Elektromobilität". The aim of the project is the development and implementation of e-car sharing concepts in 10 residential areas in the city of Hamburg including new developing and existing neighborhoods. The HafenCity University (HCU) accompanies the project regarding the evaluation of the locations, the implementation process, the urban integration and the user acceptance of the concepts. Further research topics are use cases and business models for e-car sharing in residential development and the integration of electric vehicles in existing energy systems. We like to present results and experiences from the ongoing project.

The HCU furthermore has set up a body that provides mobility management and mobility consulting at five "e-Quartier"-sites. This body's tasks include support of the car sharing providers in terms of acquiring new customers and therefore research participants through information and communication. It also contains promoting sustainable mobility in general by focusing not only on car sharing but by considering the whole spectrum of available transport means as well as local supply options. We will use our presentation to give an outlook on the elements of mobility management for the project "e-Quartier" and the way it will be executed. The discussion, which will follow our speech, can be used to take a critical view on our findings and prospects.

Speaker Abstract

(3.2) Explaining success and failure in Sino-European collaboration: Drawling lessons from Shenzhen International Low Carbon City

Author
Name: W. Martin de Jong
Title: Antoni van Leeuwenhoek professor in urban and infrastructure development in China
Institution: Delft University of Technology
Country: The Netherlands

Summary:
In the wake of global climate change and strengthening links between the EU and China on sustainable urbanization, a considerable number of collaborative projects have been undertaken. The success of and satisfaction with these projects depend of good vision, promising content and complementarity of needs, but also on good understanding of administrative and cultural differences. Which bottlenecks exist in Sino-European collaboration and what possibilities are there to deal with them? This contribution highlights the key issues in complications as they emerge in Sino-European interaction on sustainable urbanization and offers ways of dealing with them, partly based on the author's personal experience in developing Shenzhen International (former known as 'Sino-Dutch') Low Carbon City.

Space for notes:

Speaker Abstract

(3.4) Copenhagen's road to carbon neutral transport

Author
Name: Kasper Brenøe Isbrand
Title: E-mobility Coordinator
Institution: The City of Copenhagen, the Technical and Environmental Administration
Country: Denmark
Email: zr1b@tmf.kk.dk

Co-Author: Birte Busch Thomsen, the City of Copenhagen, the Technical and Environmental Administration, bibusc@tmf.kk.dk

Summary:
The City of Copenhagen has set a goal to be the first carbon neutral capital in the World in 2025. The road to carbon neutrality is an ambitious plan requiring long-term action, but it is realistic. In the transport sector initiatives include:

- Considerable investments in bicycle infrastructure and public transport
- Supporting Car Sharing, EVs in particular: 850 electric car sharing vehicles will run in Copenhagen by the end of 2016
- Replacing ALL City Administration vehicles with vehicles on new fuels
- Electric buses
- Developing a public infrastructure for EV charging: 500 charging spot established so far
- Green Taxis: Working with the taxi business to go carbon neutral
- Developing mobility projects to help citizens and companies chose green transport, e.g. Mobility As A Service
- Carbon Neutral cargo delivery
- Converting heavy vehicles to biogas and other new fuels
- Improving the political framework to support carbon neutral vehicles in general

Mobility initiatives are responsible for 10 percent of the total reduction.

Space for notes:

Speaker Abstract

(3.6) E-Mobility and Urban Development in Hamburg and Shenzhen

Author
Name: Johannes Lauer
Title: Dipl.-Geogr.
Institution: HafenCity University Hamburg
Country: Germany
Email: johannes.lauer@hcu-hamburg.de

Co-Author: Prof. Dr.-Ing. Wolfgang Dickhaut, HafenCity University Hamburg (HCU), Germany, Wolfgang.dickhaut@hcu-hamburg.de

Summary:

Hamburg and Shenzhen combine similar spatial scales with different requirements for promoting New Energy Vehicles (NEVs). With China's leading NEV producer BYD, Shenzhen has set up a good policy environment for industry development. Hamburg is a leading city for NEV development in Germany, but in terms of the sheer number of vehicles, Shenzhen seems to be acting faster than Germany's second-largest city. By the end of 2015, just 0.6 % of vehicles in Hamburg (1.8 Million inhabitants) were electrified (1,100 NEVs, 600 public slow charging points, 50 fast charging points). The "low carbon city" Shenzhen (more than 11 Million inhabitants) promoted up to 52,000 NEVs with 50,000 slow charging points and up to 1,800 fast charging points. This is a total share of 1.57 % of registered vehicles of Shenzhen Municipality. Both cities have strong targets for CO2-reduction. Hamburg hopes/plans to reduce CO2 by 40% by 2020 and 80% by 2050 (with reference data from 1990). Shenzhen set low-carbon targets with a 40-45% reduction by 2020 (reference data from 2005).

Both city governments set up strong policies with the help of planning and economic instruments to promote e-mobility. Hamburg identified four fields of key-activities: E-mobility solutions for economic transportation, multimodal urban mobility concepts, the integration of NEVs into public transport and the construction of inner-city charging infrastructure. With 5 billion Yuan (804 million USD), Shenzhen has prioritized the electrification of public transport systems - especially for bus and taxi fleets. Comprehensive solutions have been adopted in several low-carbon city projects that prioritize Transit-Oriented Development (TOD) strategies. This is combined by the strong development of pubic charging stations, mainly for economic fleets. Like in Hamburg, promotion for private users will be the last and most difficult step.

While Shenzhen governs with hard sanctions for fuel car number plates and very high buy-incentives for NEV-users, Hamburg has set up softer incentives like the promotion for company fleets to use NEVs, better parking regulations, or a better environment for e-Carsharing services. The challenge in Hamburg and Shenzhen is to encourage citizens to use NEVs while finding the balance between economic development and environmental protection.

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Speaker Abstract

(3.5) The Qianhai Transportation Hub Urban Development Project

Author
Name: Nicolas Pomränke
Title: Dipl.-Ing. Architekt, Associate Partner
Institution: gmp · Architekten von Gerkan, Marg und Partner
Country: Germany

Summary:
The Qianhai district is an urban extension of the city of Shenzhen, which is one of the most important cities in the Pearl River Delta and whole China. Its economic power generates a constant growth, which lets the city reach as well its natural (sea and mountains), as its political borders (Hong Kong), which is why the Qianhai district has been gained by land reclamation from the Qianhai bay. Its strategic asset is the closeness to Hong Kong and Guangzhou, which will be linked by a high-speed train stopping at the Qianhai Traffic Hub. The Hub will connect a long distance train, a rapid transit system and several metro lines and thus offer an exceptional public transport system, which will be the main means of transportation for the whole quarter.

These conditions have an important impact on the possibilities of urban design. As most people will arrive by public transport and the complete service traffic is handled underground, the street level is strongly relieved from vehicular traffic. These free spaces offer the chance to rethink an urban quarter in terms of expanding the public realm and reclaiming livable urban spaces, which have been occupied by cars before.

The design for the Qianhai Hub Project tries to expand the public space in all three dimensions while offering excellent connectivity at the same time. Although large shares of the expected traffic is still based on fuel powered individual traffic, the intention to regain the public space for the citizens can be considered as a general strategy for the future changes of our transportation systems.

Space for notes:

Speaker Abstract

(3.8) Influence of EVs and Smart Transportation

Author
Name: LI Zhiheng
Title: Associate Professor
Institution: Graduate School at Shenzhen, Tsinghua University
Country: China
Email: li.zhiheng@sz.tsinghua.edu.cn

Co-Author: Associate Professor Kai Zhang, Graduate School at Shenzhen, Tsinghua University, China

Summary:

EVs have lot of benefits to developing country, such as reduction of carbon emissions (almost no carbon emission to Metropolis), high energy efficiency (especially in the case of low speed on Urban Roads), and diversification of fuel supply. However, several factors limit the popularity of EVs, range Anxiety, lack of Intelligent Sharing Service, etc. On the other hand, ITS can help narrow the limitation, such as charging facilities planning based on Transportation Big Data Processing, and intelligent charging route guidance based on LBS service and Telematics.

The presentation is organized as follows. The limitation of EVs is introduced, and then the relation between EVs and ITS is discussed, especially the solution of EV Range Anxiety and the solution of EV Sharing Service under ITS context. Finally how to evaluate EVs influence on ITS is introduced.

Space for notes:

Speaker Abstract

(3.9) Electric cars in company and carsharing fleets in German cities

Author
Name: Lukas Minnich
Title: Dipl.-Ing.
Institution: Öko-Institut e.V.
Country: Germany
Email: l.minnich@oeko.de

Co-Author: Dr. Friederike Hülsmann, Öko-Institut e.V., Germany, f.huelsmann@oeko.de

Summary:

Several German cities such as Hamburg and Stuttgart are obligated by EU directives to significantly reduce immissions of NOx and particle matter in the short term. At the same time, climate change abatement targets demand decarbonisation of the transportation sector until 2050. It is obvious that there is no exclusive solution for these challenges. One approach is to replace fossil fuels and switch to alternative drive trains such as e-mobility. However, necessary changes do not stop at the technological level. More flexible and demand-driven means of transport have to be introduced in order to substitute private car use by multimodal mobility patterns. Unlike in rapidly growing and developing economies such as China, in Germany these new concepts can nowadays hardly ever be designed from scratch. Introducing these new technologies and behaviours into long-established urban structures and consumer habits is an entirely different challenge.

In the "ePowered Fleets Hamburg" project, funded by the German Federal Ministry for the Environment, Oeko-Insitut analyses deployment patterns of more than 400 electric vehicles and user attitudes of over 250 companies in Hamburg region over three years. First evidence shows that some companies are enthusiastic about achieving 100% e-mobility as fast possible. They strive for extensive use and full integration of electric cars in their fleet. Yet, findings for most companies taking part in the project show that restrictions for conventional vehicles and additional privileges for electric cars will be necessary so that they opt for further electrification of their fleet.

In the "share" project funded by the German Federal Ministry for the Environment, the research partners Oeko-Institut and the Institute for Social-Ecological Research in collaboration with car2go analyse the users of one-way carsharing by applying an online panel survey over two years in Stuttgart, Cologne and Frankfurt. Socioeconomic characteristics, basic lifestyle, acceptance and attractiveness of electric versus conventional cars with conventional combustion engines and mobility behaviour are explored. First results show that electric and conventional cars are perceived similarly useful, comfortable and reliable. Users of one-way carsharing are mostly young, high educated people with a high affinity to information and communication technologies. They show a multimodal mobility using more different means of transportation than the average population in the cities studied.

In both cases, preliminary project results give some first hints about which policies can give incentives for widespread use of the new mobility options and how emissions abatement can be optimised.

Space for notes:

Speaker Abstract

(4.1) Built-in wireless cell sensors, optical cell sensors and decentralized signal processing for precise cell state estimation

Author
Name: Karl-Ragmar Riemschneider
Title: Prof. Dr.-Ing.
Institution: Hochschule für Angewandte Wissenschaften Hamburg (HAW)
Country: Germany
Email: karl-ragmar.riemschneider@haw-hamburg.de

Co-Authors: Dipl.-Phys. Valentin Roscher, M.Sc. Nico Sassano, HAW Hamburg

Summary:
Lithium ion batteries require permanent monitoring during operation to ensure safety and efficiency of use. This is especially valid for batteries for the automotive sector, including electromobility and starter batteries. In our research group at the HAW Hamburg, a wireless sensor system was developed to provide continuous monitoring of individual cell voltage and temperature. Data is reported to a central control unit. In this setup, no additional measurement wires between cells are necessary, eliminating the cost and weight of several hundred measurement cables as well as reducing problems arising from faulty connectors. Battery current can be measured centrally per module if all cells are connected in series.

As an additional functionality, the sensor system is able to perform Electrochemical Impedance Spectroscopy (EIS) by combining high-precision low-jitter voltage and current measurements. Spectral data is preprocessed on the sensor to lower load on the wireless channel. To present a complete system, a compact excitation source for AC and DC current has been developed recently to allow on-board EIS measurements during operation and rest phases e.g. in car batteries.

We expect that integration of measurement and distributed computing into a single sensor chip will provide a low-cost low-effort alternative to current wired cell sensor approaches. Regular EIS measurements can increase safety, reliability and energy efficiency of the battery cells by improving cell state determination and prediction.

Space for notes:

Speaker Abstract

(4.2) Modeling Li-ion batteries for state-of-charge, state-of-health and temperature indication

Author
Name: Dmitri L. Danilov
Title: Dr.
Institution: Forschungszentrum Jülich / Eindhoven University of Technology
Country: Germany / The Netherlands
Email: d.danilov@tue.nl

Co-Author: Prof. Dr. Peter H.L. Notten, Forschungszentrum Jülich / Eindhoven University of Technology, Germany / the Netherlands, p.notten@fz-juelich.de

Summary:
Intensive development of various kinds of Electrical Vehicles (EV) raises the demand for ad-vanced on-board Battery Management Systems (BMS). Advanced BMS must ensure safe and reliable operation of the battery (pack) and provide a driver for a number of important indications, such as State-of-Charge, remaining operation time and State-of-Health. A mathematical model of rechargeable battery is the core of the BMS. Such models are based on a detailed description of physical and (electro-)chemical processes, and therefore contain a large number of non-linear algebraic, ordinary and partial differential equations. The high complexity and large amount of computing power necessary for a proper implementation of such models creates, however, a barrier for their introduction to automotive applications. Nevertheless, many simple and efficient approaches to battery modeling exist, including ageing determination, adaptive State-of-Charge indication and sensorless temperature estimation. Advantageously, these methods are not computationally demanding and therefore very well suitable for implementation in modern BMS.

Space for notes:

Speaker Abstract

(4.3) General requirements and challenges for battery management in EV

Author
Name: Ghanim Putrus
Title: Professor of Electrical Power Engineering, BSc, MSc, PhD, CEng, MIET
Institution: Faculty of Engineering and Environment, Northumbria University, Newcastle upon Tyne NE1 8ST, UK
Country: United Kingdom
Email: ghanim.putrus@northumbria.ac.uk

Summary:

The need for high-energy batteries to power laptops, mobile phones and electric vehicles is driving the current interest and developments in battery technologies. Lithium ion batteries are the current industry standard for these applications, due to their relatively high energy density and low self-discharge properties. However, as other type of batteries, they do lose capacity with time and cycling.

Battery performance and lifetime depend not only on its chemistry but also on the way the cells (comprising the battery pack) are managed and the battery is used. A battery management system is usually used to monitor the state of health of individual cells and ensure that cells loading and voltages are balanced. External factors such as charging/discharging profiles also affect the battery lifetime, and this makes battery management more challenging.

This talk will give an overview of the main factors that affect battery degradation and try to define general requirements and challenges to retain the state of health of the battery. Results of experimental tests conducted on Li ion cells in order to define favourable charging/discharging profiles will be presented. Smart control of battery charging/discharging and its role in reducing battery degradation and extending its lifetime will be introduced.

Space for notes:

Speaker Abstract

(4.4) Customised Lithium Cell Solutions

Author
Name: Torge Thönnessen
Institution: Custom Cells Itzehoe GmbH
Country: Germany
Email: tt@customcells.de

Summary:

Batteries are used in a wide variety of applications. Customized battery solutions are often required, e.g. in high-temperature environments or construction space limitations. Material features such as improved heat and shock resistance can be appropriately produced. Also the cell form factor can be tailored.

Custom Cells Itzehoe GmbH (CCI) provides customised lithium ion cells and cell components for demanding and research applications. A modular system allows the design of solutions for various requirement profiles. The manufacturing concept is based on lamination technology and enables CCI to produce customised lithium accumulators offering a broad range of formats and a whole spectrum of unique features. Small standardised test cells are the basis for rapidly generating a range of parameters that can be reliably scaled into application-specific, large-format lithium accumulators.

CCI also provides cell components for research institutes. This includes various cathode and anode electrodes cut for lab scale coin cells or as electrode coils for small-scale manufacturing. Electrode chemistry as well as physical parameters such as layer thickness and current collector properties can be chosen from a broad range of options.

In the talk, CCI will outline processes and materials used in cell and cell component production and present real-world applications of customized battery cells.

Space for notes:

Speaker Abstract

(4.6) Different generations of Lithium based batteries in the field of EV

Author
Name: Michael Fröba
Title: Prof. Dr. rer. nat.
Institution: University Hamburg
Country: Germany
Email: froeba@chemie.uni-hamburg.de

Co-Authors:
Anika Juhl, Sebastian Kraas and Julia Ziegler, University Hamburg, Germany

Summary:
The materials used as anodes and cathodes in lithium ion batteries nowadays are classified as first generation. Typical materials are graphite (anode), LiCoO2 and LiMn2O4 (both cathode mate-rials). These materials are well-known and the battery chemistry (electrolyte and separator) is highly developed. For electric vehicles, a higher energy density is necessary. To achieve this new materials are used in batteries. Main focus for second generation batteries is the lithium sulphur battery. The energy density in Li-S batteries is up to five times higher and sulphur is extremely cheap. The third generation of lithium batteries will use oxygen as active material. This means the weight of the anode can be drastically reduced.

This presentation will start with a general overview about the chemistry of the widely used active materials in modern EVs and the second part will cover the new generation of lithium batteries.

Space for notes:

Speaker Abstract

(4.7) The progress report on the research of power battery materials at PKUSZ

Author
Name: LIU Yidong
Title: Researcher
Institution: Peking University Shenzhen Graduate School
Country: P.R. China
Email: liuyd@pkusz.edu.cn

Summary:
School of Advanced Materials (SAM), Peking University Shenzhen Graduate School (PKUSZ) played as the technical representative of the Shenzhen-Hamburg new energy vehicle demonstration and promotion partnership under SINGER project. The international workshop was held in PKUSZ with the attendance of Profs. Michael Fröba, Karl-Ragmar Riemschneider and Johannes Lauer of HCU. The co-operations on scholar exchanges and research are still going. SAM got singinificant contributions on Li-ion transfer mechanism, which resulted several important publishcation. Prof. Pan was awarded high-cited scholars of Elsevier in 2015 as well. After the national center for international research on EV power battery and materials, SAM successfully gained National Key R&D Program of 2016, Key Technology of Materials Genome on All Solid State Lithium Battery and Materials. So far SAM has built up a comprehensive facility for battery research valued RMB 80 M. And we encourge partner students to apply degree or postdoc program in the sunshine Shenzhen. Best wishes, SINGER.

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Speaker Abstract

(4.8) Different generations of Lithium based batteries in the field of EV

Author
Name: Sebastian Kraas
Title: Dr.
Institution: University Hamburg
Country: Germany
Email: kraas@chemie.uni-hamburg.de

Co-Authors:
Julia Ziegler and Michael Fröba, University Hamburg, Germany

Summary:
One of the most often cited drawbacks of battery electric cars is the inability to recharge the batteries fast. The reasons behind this are manifold and cannot be pinned down to one single component. Some reasons are more in the technical field, like lack of electricity during recharge (super chargers), others are at the junction of engineering and chemistry (heat of reaction and removement thereof) and of course, since batteries are electrochemical energy storages some reasons lie within the chemistry of the materials used as anode or cathode.

Having this in mind, we will look onto this topic from a materials chemist perspective: Which materials can be used for fast-charging? How are these materials structured? What can be done to improve the materials?

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