

Batteries & Supercaps: The Future of Electrochemical Energy Storage

Rosalba A. Rincón^{*[a]} and Greta Heydenrych^{*[a]}



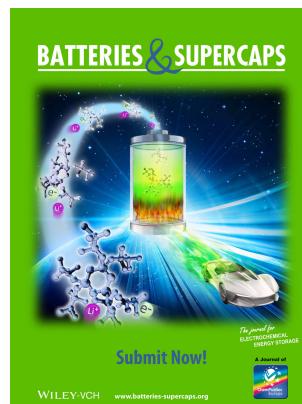
Dr. Greta Heydenrych



Dr. Rosalba A. Rincón

The deployment of sustainable energy technologies such as photovoltaics and wind turbines, which have greatly grown in the past decades, is hindered by their intermittent nature. This has been one of the greatest motivators for scientists across the globe for investigating and developing reliable energy storage systems that could offset this intermittency by storing the energy generated and making it available upon demand. The emergence of the electric vehicle (EV), including hybrids, plug-in hybrids, and all-electric cars, has also resulted in a remarkable increased interest in electrochemical energy storage technologies. Batteries and supercapacitors are used to store electricity on board of EVs and it is estimated that EV sales may constitute 15 to 30% of new-car sales by 2030.^[1] Beyond the automotive industry, these energy storage systems also have the potential to replace the powertrain systems in the current transportation infrastructure as we start seeing hybrid supercapacitor buses, boats, and trams.

The leading and most familiar energy storage system is the battery. One-time-use primary batteries have been losing market share to secondary (rechargeable) batteries like lithium-ion batteries, which power nearly every portable electronic device and EV nowadays. The continuous growth in the world market for batteries is mostly driven by the automotive industry and as the cost per kWh for EV batteries approaches that of fossil fuels, further growth in this market will be inevitable, increasing at the same time the research output in this area. But the use of batteries is not only limited to the automotive industry; the medical industry, in which miniature hand-held devices as well as im-



plants are used, is also in need of new, more powerful, yet small batteries to power them.

Supercapacitors, although they are not batteries in the narrow sense of the word as they do not involve chemical reactions, are also means of utilizing and storing alternative sources of energy. They can be charged quickly, leading to very high power density, and do not lose their storage capability over time. They are most commonly used in applications where large bursts of energy are required, such as the regenerative braking of trams. However, compared to

batteries, they have low energy densities (can store less energy per unit weight) and the costs of supercapacitor materials often exceed the costs of battery materials. Therefore, much research is being done to develop new inexpensive materials and improve the properties of these devices for everyday use, which may soon bridge the gap between batteries and supercapacitors for commercial applications. In the long run, both technologies will be working together to reach the common goal of providing the means for more sustainable energy technologies.

The extraordinary growth in this field means that scientists need a broad platform for disseminating their most exciting results. In the light of this, we are pleased to announce the latest addition to ChemPubSoc Europe's family of journals: *Batteries & Supercaps*.

Batteries & Supercaps will publish articles from across the wide spectrum of electrochemical energy storage, from fundamental research to materials applications. The journal is co-owned by ChemPubSoc Europe (<http://www.chempubsoc.eu>), an organization of sixteen European chemical societies that owns and supports a series of high-quality journals. Launched at the end of 2017, with the first articles scheduled to appear online early in 2018, *Batteries & Supercaps* has *Angewandte Chemie* as a sister journal and is published by Wiley-VCH alongside ChemPubSoc Europe journals such as *Chemistry—A European Journal*, *ChemPhysChem*, *ChemElectroChem*, *ChemPhotoChem*, *ChemSusChem*, *ChemMed-*

[a] Dr. R. A. Rincón, Dr. G. Heydenrych
Wiley-VCH Verlag GmbH & Co. KGaA
Batteries & Supercaps
Boschstrasse 12, 69469 Weinheim (Germany)
E-mail: batteries@wiley-vch.de
Homepage: <http://batteries-supercaps.org>

The ORCID identification number for the authors of this article can be found under <https://doi.org/10.1002/batt.201700001>.



Chem, *ChemBioChem*, *ChemCatChem*, *Chemistry Open*, *ChemPlusChem*, *European Journal of Organic Chemistry*, *European Journal of Inorganic Chemistry*, and the magazine *Chemistry Views*.

Batteries & Supercaps will publish a variety of manuscript types, including both Communications and Full Papers, in addition to Minireviews, Reviews, Highlights, and Concept articles (see our website at <http://batteries-supercaps.org>). Such a broad range of article types ensures firstly that our authors can choose the most appropriate format in which to communicate their results, and secondly that our readers can choose whether they wish to focus on the latest developments in a concise format or if they would prefer an overview of a specific topic placed in the context of the current literature. Contributions at *Batteries & Supercaps* will be subjected to rigorous peer review by experts in the field with the goal of ensuring that all content is scientifically sound and is of the highest possible quality.

We are both very excited and grateful to have a truly excellent Editorial Board supporting our newest journal, with members from across the globe who have established themselves as experts at the very cutting edge of electrochemical energy storage research (please see the Table 1 below for a full list of Editorial Board members). We are delighted to have the leaders in the field as chairs of the Editorial Board, namely Professor Jaephil Cho (South Korea), Professor Jürgen Janek (Germany), and Professor Linda Nazar (Canada).

As for all of our sister journals, *Batteries & Supercaps* will be published online, with a print-on-demand service available should you wish to order a specific issue of the journal or a custom selection of articles.

For all of 2018, *Batteries & Supercaps* will be free to access. Access to the journal will be automatically available to you if your institution has a subscription to *Chemistry—A European Journal*. Alternatively, you can gain complementary access to the journal for this time period by registering on our website. You can also keep up to date with the latest published results by keeping an eye on our Twitter feed (@Batt_Supercaps) and on *ChemistryViews*, where some of our recently published papers will be featured.

As at our sister journals, at *Batteries & Supercaps* articles can be made freely available by publishing in open-access format should you so choose, or should you be required to do so by your funding agencies. Our website, <http://batteries-supercaps.org>, contains more details on our OnlineOpen service.

Once a manuscript has been accepted, our authors will be offered the opportunity to publish their paper immediately online as an Accepted Article. Once your manuscript has been



Jaephil Cho



Jürgen Janek



Linda Nazar

professionally typeset, the Accepted Article will be replaced by the Early View version.

From January 1st 2018 the ORCID (Open Researcher and Contributor ID) numbers for all submitting correspondence authors will be required on submission of all papers to *Batteries & Supercaps*. This requirement will also apply to *Angewandte Chemie* as well as our ChemPubSoc Europe and ACES sister journals. An ORCID ID is unique digital identifier that belongs to a particular researcher, regardless of discipline, and is

intended to help solve the name disambiguation problem. It can be used to indicate your professional affiliations, and it can also be easily linked to your publications. Registration is free and takes only about 30 seconds. If you want to find out more about the concepts behind ORCID, see the latest interview with Alice Meadows (director of Communications for ORCID) on *ChemistryViews* ("Your Lifelong Digital Name", <https://doi.org/10.1002/chemv.201600091>).



This past July, the Asian Chemical Editorial Society (ACES), together with the Gesellschaft deutscher Chemiker (GDCh, German Chemical Society) inaugurated the ACES & GDCh Symposium series as well as the Ryoji Noyori ACES Award at the centenary congress of the Royal Australian Chemical Institute, an ACES partner. Symposia in the series are intended to take place every two years during the Asian Chemical Congress and are designed to bring together scientists from Asia, Europe, and beyond. The Ryoji Noyori ACES prize recognizes an outstanding scientist who has made outstanding contributions to the field of chemistry while embracing the international, collaborative spirit of ACES. The inaugural recipient was Professor Chi-Ming Che of the University of Hong Kong. You can read more about the first symposium and award on *ChemistryViews*.

Mobile is trending more than ever. Therefore, a brand new app combines the existing apps for individual journals such as *Angewandte Chemie* together with *Batteries & Supercaps* (coming soon!) and all other ChemPubSoc Europe journals as well as ACES journals to give you convenient access to several journals in one place.

Table 1. The Editorial Advisory Board of *Batteries & Supercaps*.

| Co-Chairs | | | | | |
|------------------|-------------|--|-------------------|-------------|--|
| Jaephil Cho | South Korea | Ulsan National Institute of Science and Technology (UNIST) | Yoon Seok Jung | South Korea | Ulsan National Institute of Science and Technology (UNIST) |
| Jürgen Janek | Germany | Universität Gießen | Kisuk Kang | South Korea | Seoul National University |
| Linda Nazar | Canada | University of Waterloo | Shinichi Komaba | Japan | Tokyo University of Science |
| Members | | | | | |
| Philipp Adelhelm | Germany | Friedrich-Schiller-Universität Jena | Pooi See Lee | Singapore | Nanyang Technological University |
| Vlad Alexandru | Belgium | Université catholique de Louvain | Liqiang Mai | China | Wuhan University of Technology |
| Andrea Baldacci | Germany | Friedrich-Schiller-Universität Jena | Ho Seok Park | South Korea | Sungkyunkwan University |
| Peter Bruce | UK | University of Oxford | Huisheng Peng | China | Fudan University |
| Guozhong Cao | USA | University of Washington | Volker Presser | Germany | Universität des Saarlandes |
| Gabriele Centi | Italy | Università degli Studi di Messina | Teófilo Rojo | Spain | CIC Energigune |
| Jun Chen | China | Nankai University | Patrice Simon | France | Université Paul Sabatier |
| Xiaodong Chen | Singapore | Nanyang Technological University | Andy xueliang Sun | Canada | The University of Western Ontario |
| Sheng Dai | USA | University of Tennessee | Yang-Kook Sun | South Korea | Hanyang University |
| Yury Gogotsi | USA | Drexel University | Atsuo Yamada | Japan | University of Tokyo |
| Harry Hoster | UK | Lancaster University | Guihua Yu | USA | The University of Texas at Austin |
| Yong-Sheng Hu | China | Institute of Physics, Chinese Academy of Sciences | Gleb Yushin | USA | Georgia Institute of Technology |
| Chi-Chang Hu | Taiwan | National Tsing Hua University | Xiaogang Zhang | China | Nanjing University of Aeronautics and Astronautics |

Users can select their favorite titles from the aforementioned portfolio in the app and use their or their institution's access to full text wherever they go at no extra cost. Search was improved to cover articles on the device and online, and new publishing workflows such as Accepted Articles were added. Download of individual articles or entire issues for offline reading is still a key feature of the app, as is a tailor-made browsing and reading experience for tablets and smartphones. Issue or keyword alerts remain a convenient way to stay up to date in your field. A newsfeed from ChemistryViews.org lets you explore what else is going on in chemistry.

The app is available for iOS and Android. We will soon cut off content feeds to the individual journal apps, so get the new family app now and enjoy the added features!

In summary, we are delighted to bring you *Batteries & Supercaps*, sister journal to *Angewandte Chemie* and *ChemSusChem*, and brought to you by the same team behind *ChemPhysChem*, *ChemElectroChem*, and *ChemPhotoChem*. We look forward to working with you and to publishing your latest high-quality results from over the entire scope of electrochemical energy storage!

- [1] T. Randall, *The Electric-Car Boom is So Real Even Oil Companies Say It's Coming*, Bloomberg.com, <https://www.bloomberg.com/news/articles/2017-04-25/electric-car-boom-seen-triggering-peak-oil-demand-in-2030s>, accessed on November 9th, 2017.

Version of record online: February 26, 2018