

Editorial

Welcome to Batteries—A New Open Access Journal on Battery Technology and Systems

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Batteries are a key technology of the 21st century and even of the 20th century. The success of mobile communication devices, as cellular phones, tablet computers, digital still cameras, and laptop computers was strongly supported by the improvements of the energy storage technologies. In the 1980s only lead acid and nickel cadmium batteries were used in mobile applications. The development of more advanced technologies as nickel-metal hydride and Li-ion and their introduction into the market in 1990 and 1991 pushed the development of mobile devices. About 10 years later, the development of high power li-ion batteries pushed the development of cordless power tools and other new applications that were not possible with older battery technologies.

Since the introduction of Li-ion batteries the specific energy was improved by a factor of about 2.5. Post lithium ion battery technologies, as lithium-sulfur and lithium-air, with a high potential in further significant energy density increase are under development and require many years of development until these technologies will enter mass production. As lithium is a relatively rare metal, there are developments to use sodium or magnesium as active species in batteries.

The wish to change from combustion driven vehicles to electric vehicles is more than 100 years old. During the turn of the 19th century there was a competition between both technologies. The limited energy content of the used lead acid batteries resulted finally in gain in acceptance of the combustion engine. Several times within the last 50 years, the development of electric vehicles was restarted with always the same result: Batteries were too heavy and not able to store enough energy. Today we see electric vehicles that can drive several hundred kilometers with one charge. However, batteries are still heavy and expensive. Further battery development and improvements are required to bring electric vehicles to everyone within the near future. Electric vehicles do drive without any direct emissions, are silent and are highly efficient. Another key feature is that they can be powered by 100% renewable energies, as wind and photovoltaic. This fantastic ability will give us a long term technology that will bring stationary and mobility technologies together. And the interface between both systems is the

battery. It must equalize the strong fluctuations of the wind and solar power generation. Or it must stabilize the power network and avoid instabilities. Stationary battery storage systems will become a key component of our future power system. Here we see today the first battery storage systems in the 100 MWh range. Another fantastic feature of batteries is their high scalability. So batteries in the range of some mWh for micro systems are also possible as the mentioned huge stationary systems. The use of new materials, improved cell design and system approaches and control strategies will result in lower weight, longer lifetime, higher reliability, lower costs and safer batteries. There exist many possibilities in research and development to reach these targets. Depending on the application different battery technologies and developments are of interest. So we get an increasing diversity in battery systems resulting in a strong increase in knowledge and worldwide battery research activities.

Batteries focuses on all battery research topics, from small to huge systems, from mobile and vehicle to stationary applications, from aqueous to organic battery technologies, and from material and cell level to battery systems. Additionally, the integration and numerical simulation of cells and battery systems are also addressed in this journal. Batteries require multidisciplinary cooperation between chemists, physicists, mechanical and electrical engineers; the battery journal is open for fundamental science as well as for engineering science topics. It is a platform for the battery research community. The target is that batteries achieve a high impact and will get a worldwide well-known journal in the field of energy storage.

I invite everyone who is working on battery research to publish new results or review papers within *Batteries*. If you are not sure, if the topic you want to publish fits within *Batteries* please contact us to clarify the possibilities.

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