



## Preface

This special issue of the Journal of Power Sources is devoted to the honour of Prof. Dr. Jürgen Garche's 60th birthday. It is based on selected papers from the 88th Bunsenkolloquium which took place in the monastery of Roggenburg, 14–15 June 2004, reflecting the topic "Fuel Cells and Batteries: What are the Differences and Similarities?" Bunsen Colloquia are a Conference Series for Physical Chemistry having a long tradition in Germany. Prof. Garche at this occasion retired as Head of the Department "Electrochemical Energy Storage and Energy Conversion" of ZSW, the Center for Hydrogen and Solar Research in Ulm. He has received several important honours for his contributions to electrochemical energy conversion, e.g. the Christian-Friedrich-Schönbein Gold Medal of the European Fuel Cell Forum.

Jürgen Garche started his scientific career in Dresden, where he studied and graduated in chemistry at the Technical University and also submitted his doctoral thesis in 1970 on "Thermodynamics of Concentrated Electrolytes". During his stay in Dresden, he was also taught by the famous electrochemist Kurt Schwabe. As was common in East Germany at that time he continued to work at his Alma Mater, where he was promoted to assistant lecturer supervising a research group. During the 1970s, he started work on the interface reactions of lead acid batteries, a research interest that he continued until today. He received his Habilitation degree for the work on lead acid batteries in 1982. Until 1987, he was a lecturer for Technical Electrochemistry at the TU Dresden. After the fall of the iron curtain and the German reunification Jürgen Garche joined ZSW in Ulm in 1991, as the section head for batteries. Soon afterwards he was also appointed as apl. Professor at the University of Ulm. In 1995, he took over the management of the Department in Ulm from Prof. Witschel. Under his supervision the institute expanded and developed an increased interest in fuel cell research leading also to a stack development, which is the basis of the fuel cell activities today. Jürgen Garche has published about 300 papers on electrochemical energy conversion, mainly batteries, fuel cells and electrochemical capacitors.

Reflecting Jürgen Garche's scientific work, the focus of the 88th Bunsen colloquium was set to the discussion of the similarities but also the differences between both types of electrochemical energy converters, fuel cells and batteries which are in principal closely related but exhibit some important engineering differences. The aim of the meeting was also to bring together the scientific communities for fuel cells and batteries and start a new discussion on possible synergies among scientists working in these thematic areas. In recent years, specialisation in science has increased strongly and as a consequence separate communities for batteries and fuel cells have developed. This was enforced by the enormous expansion in the fuel cell related activities worldwide.

Although, historically the fuel cells were considered a special form of batteries several of the contributors at the symposium stressed the significant differences that exist between batteries and fuel cells: not only the obvious difference of the media management in fuel cells, but also the different material requirements as well as differences of system designs were discussed and described in details. It was stated that the separation, which is found today is indeed a consequence of significant variances in materials, applications and requirements. However, it was also pointed out that a mutual understanding of the technology is essential. In many applications hybrid system consisting of fuel cells and batteries will be the technological solution. In this respect, Jürgen Garche's choice to distribute his work with equal intensity on the development of both fuel cells and batteries seems to have foreseen the necessary combination of these energy converters for the full system benefit.

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