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EDITORIAL

The renewed interest in fuel cells as efficient energy converters with low or zero local emissions has motivated a substantial number of research groups in Switzerland to pursue projects in this field. This wide portfolio of activities prompted a need for information exchange, coordination, and networking. On the initiative of Dr. A. Hintermann from the Swiss Federal Office of Energy, a first networking workshop was held at the Paul Scherrer Institut (PSI) in February of 2003. This starting event was followed by the 'Swiss Fuel Cell Seminar' held in Yverdon in May 2003.

When the guest editors of this issue (G. Scherer, A. Hintermann and myself) were approached by the editor of CHIMIA to give an account of fuel cell research in Switzerland, we were faced with the alternative of either presenting numerous (and necessarily overlapping) one-page contributions, or of trying to bring together the authors from diverse groups across Switzerland who are active on related topics. Although the latter strategy turned out to be an ambitious undertaking, the result presented in this issue appeared quite rewarding. After a short review on the history of fuel cell research in Switzerland, seven issues are addressed in articles authored jointly by experts from the technical universities, research institutions, and industrial laboratories.

Out of the six main fuel cell (FC) families [1], researchers in Switzerland are mainly focusing on the polymer electrolyte (PEFC) and solid oxide (SOFC) fuel cell classes. As these two types have distinct characteristic features, they are exposed separately in two contributions each. One article is devoted to novel materials used in single polymer electrolyte and solid oxide fuel cells, respectively; this is complemented by a second article describing the assembly of stacks and systems.

Three cross-cutting issues have been identified where the PEFC and SOFC communities share strong joint interests. The first topic concerns the diagnostic methods, including electrochemical characterization by classical and advanced approaches, spectroscopic investigations, and imaging techniques. The second topic of common interest is modeling, where a hierarchy of approaches and model families is emerging. Fundamental studies start from representing the transport and electrochemical phenomena in the single cell; this is supplemented by description of heat and mass transfer phenomena at the level of cells and complete stacks and systems, often calling for a nesting of models and simplified descriptions at the most highly aggregated level. In view of the importance and the cross-cutting character of this topic, a dedicated fuel cell research symposium on 'Modelling and Experimental Validation' was held at ETH Zurich in March 2004, with a successor workshop planned for early 2005. The third overlapping topic is fuel processing, in particular reforming techniques that are required to transform the raw fuel into components that can be processed by electron transfer at the catalyst/electrolyte interface.

Serving as a guest editor to CHIMIA has been a rewarding experience, thanks to the continued advice and support of Dr. Günther Scherer (PSI) and Dr. Alphons Hintermann from the Swiss Federal Office of Energy, with whom I was privileged to share the editorial task. In particular, I would like to acknowledge Dr. Scherer's experienced input regarding potential authors and topic selection. Dr. Alphons Hintermann has strongly supported the endeavor, and was of tremendous help in motivating the authors to contribute. Most importantly, he has successfully steered for many years the fuel cell research program of the Swiss Federal Office of Energy (BFE), and his financial support has triggered and sustained many of the research activities of which we are proud to present results. For example, the successful demonstration of the Swiss fuel cell car HY-LIGHT in October 2004 was only possible thanks to a continued effort in fundamental fuel cell research over more than a decade.

Last but not least, we thank CHIMIA's experienced senior editor, Prof. Camille Ganter, for accompanying the genesis of this issue, and for his patience with late deliveries. Addressing the readers of CHIMIA, we hope you will find the topics of interest, enjoy the reading, and give us your feedback in order to foster the scientific debate on fuel cells in Switzerland that has been successfully started.

Prof. Dr. Alexander Wokaun
Department of Chemistry and Applied Biosciences, ETH Zürich
Head of the General Energy Research Department at the Paul Scherrer Institut

[1] According to the employed electrolyte and the operating temperature, fuel cells (FC) are usually grouped into the following types: alkaline FC, phosphoric acid FC, polymer electrolyte FC with hydrogen fuel, direct methanol FC, molten carbonate FC, and solid oxide FC.

It is with great appreciation that the Editorial Board of CHIMIA warmly thanks the coordinating guest editors Prof. Dr. Alexander Wokaun, Dr. Günther G. Scherer, and Dr. Alphons Hintermann acknowledging the broad and interesting selection of authors and topics as well as the efficient realization of the present issue on 'Fuel Cell Research in Switzerland'.