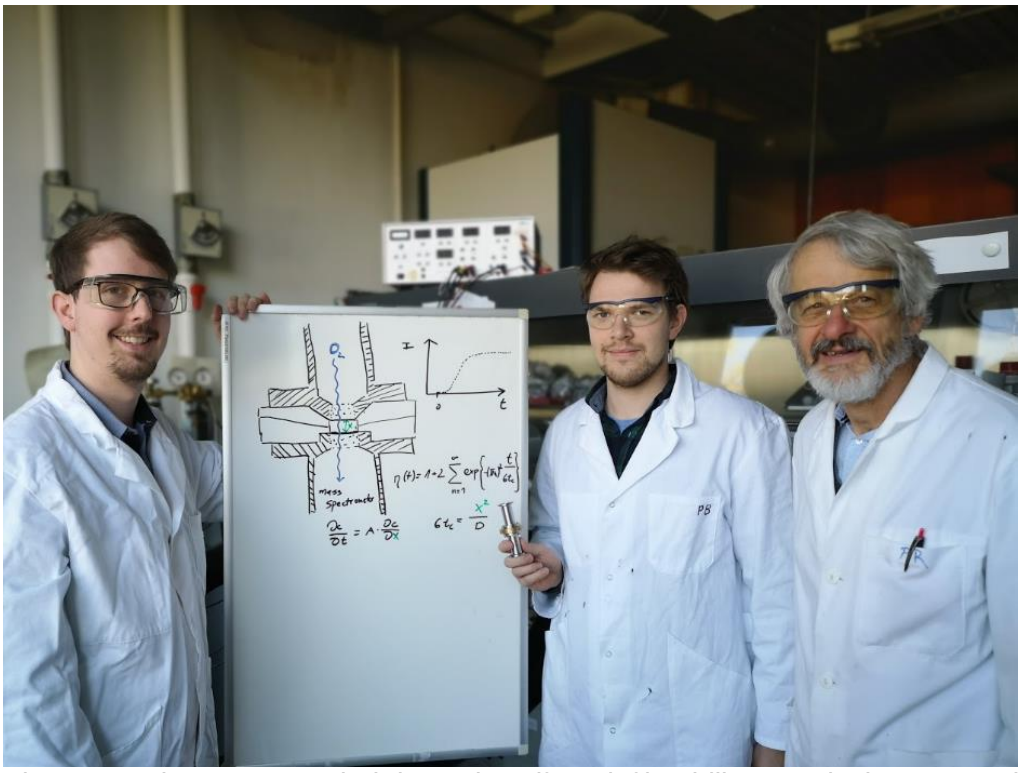
Simultaneous determination of solubility and mobility of particles
University of Bonn signs license agreement with Hiden Analytical

A team of inventors from the Institute of Physical and Theoretical Chemistry at the Rheinische Friedrich-Wilhelms-Universität Bonn has developed a thin-film sensor that can be used in conjunction with a mass spectrometer to determine the solubility of gases and their diffusion coefficients in solvents within a few minutes. Until now it was not possible to easily determine both parameters at the same time. A great advantage of the method is that only small volumes of liquid are required, which means that it is possible to also use extremely expensive solvents.

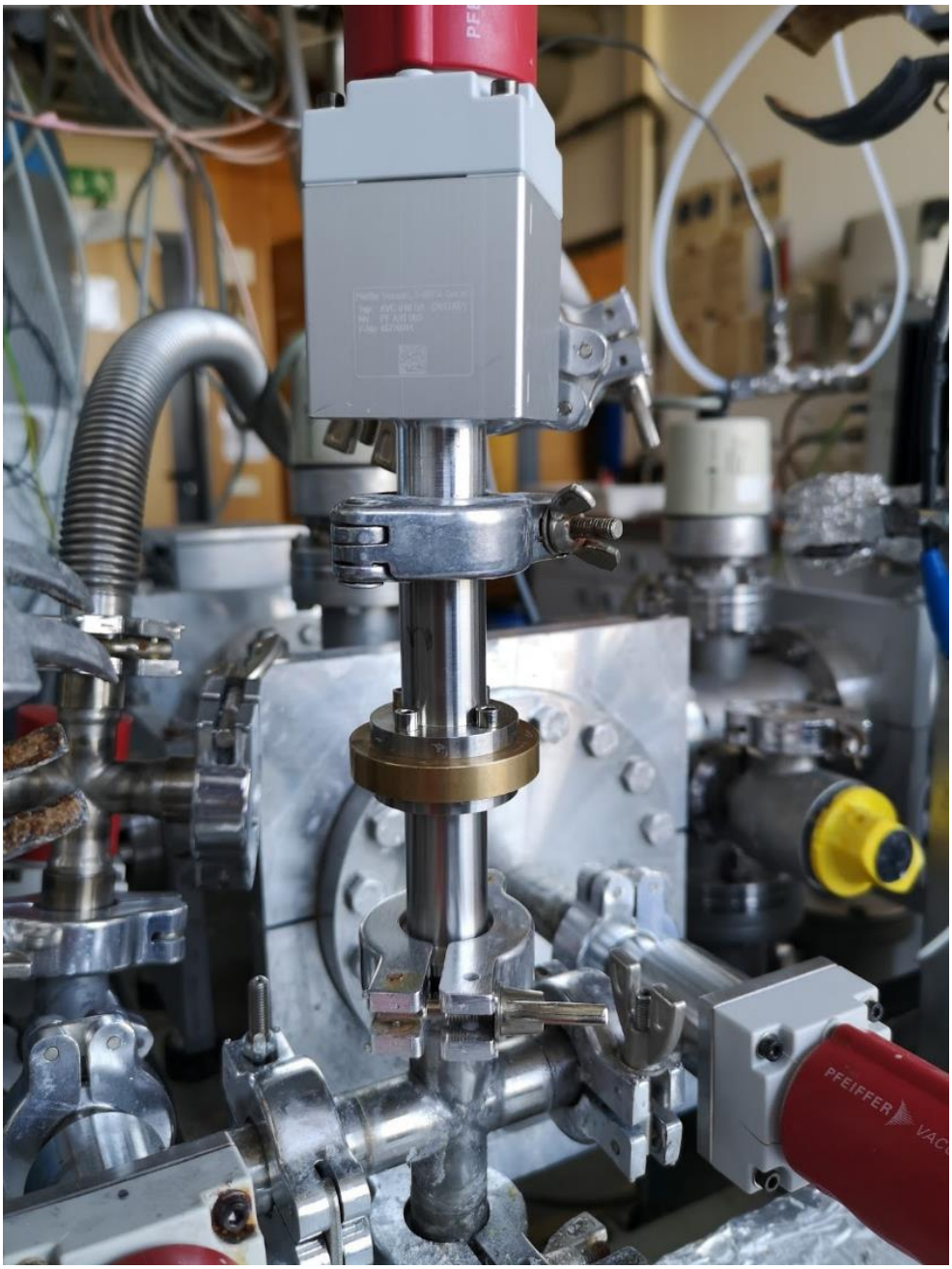
The invention is particularly suitable for secondary metal-air batteries, which are considered an attractive alternative to conventional lithium-ion batteries: With these batteries, determining the solubility and diffusion properties of oxygen is essential to optimize performance. The electrolyte is located between two porous PTFE membranes – behind one side is oxygen, behind the other side a vacuum, which leads to the analyzer. Due to the invention's universal functional principle, the thin-film sensor can also be used in the development of other forward-looking technologies, such as the development of fuel cells and electrochemical CO_2 fixation.

In December 2018, PROvendis successfully negotiated and concluded a license agreement with the internationally active company Hiden Analytical Limited on behalf of the University of Bonn. The company specializes in mass spectrometers for vacuum, gas and plasma analysis as well as surface sciences and would like to expand its portfolio with this invention.

The functional principle of the sensor and a screening of electrolytes relevant for lithium-air batteries were recently published by the inventors in the journal *Analytical Chemistry*. (P. P. Bawol, P. H. Reinsberg, H. Baltruschat, Anal. Chem. 2018, 90, 14145-14149, DOI: 10.1021/acs.analchem.8b04319 und P. H. Reinsberg, P. P. Bawol, E. Thome, H. Baltruschat, Anal. Chem. 2018, 90, 14150-14155, DOI: 10.1021/acs.analchem. 8b04320)



The researchers present their invention. (from left): Philip H. Reinsberg, Pawel P. Bawol and Helmut Baltruschat. © Martina Hegemann.



Thin-film sensor (brass) in use. © Martina Hegemann.