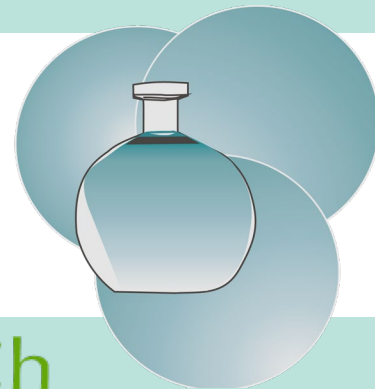


Fakultät für Naturwissenschaften Institut für Chemie



lädt ein

gemeinsam mit der Gesellschaft
Deutscher Chemiker
zum

Vortrag
von Herrn

**Prof. Aliaksandr
Bandarenka**

Department of Physics
Technical University of
Munich

GDCh

Gesellschaft
Deutscher Chemiker

“Identification of active electrocatalytic sites using EC-STM for PEMFC and electrolyser reactions”

am: 30. Januar 2025

um: 16:00 Uhr

WO: im Raum 1/232

Die kleine Kaffeerrunde vor dem Vortrag beginnt
um 15:30 Uhr im Raum 1/232.

Das Mitbringen von eigenen Trinkgefäßen ist
erwünscht.

Gäste sind herzlich willkommen!

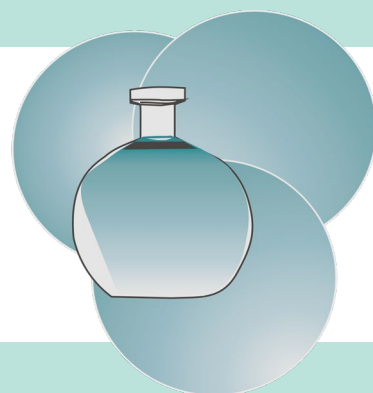


TECHNISCHE UNIVERSITÄT
IN DER KULTURHAUPTSTADT EUROPAS
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“Identification of active electrocatalytic sites using EC-STM for PEMFC and electrolyser reactions”

The key procedure in designing and understanding of electrocatalysts is identifying active sites with optimal adsorption properties towards reaction intermediates. However, such identification under reaction conditions is often very complicated and indirect. Normally, ex-situ experiments are used. In alternatives, the available resolution today is rather low, hiding the true structural origin of the activity at the atomic level. Therefore, the nature of active centers is currently known for only a few electrocatalytic reactions and a limited number of catalyst surfaces. In the presentation, I will explain the principles of identification of active sites using electrochemical scanning tunneling microscopy under reaction conditions for several reactions essential for PEMFCs and electrolyzers [1-3]. The working principles are based on the analysis of the fluctuations of the tunneling current at different sites when the reaction cannot take place or is enabled due to the right electrode potential being applied. Examples will include metal, metal oxide, and non-metallic (e.g. HOPG and MoS₂) electrocatalysts.

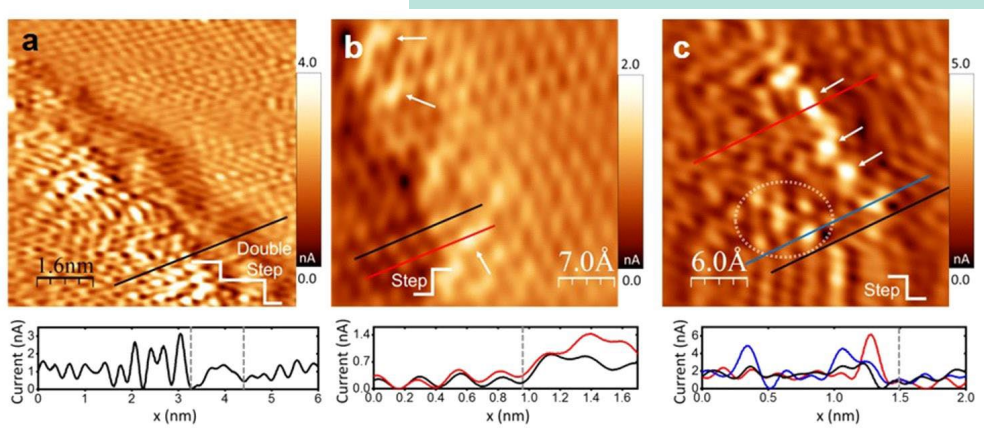


Figure 1. Examples of high-resolution n-EC-STM images of HOPG under hydrogen evolution reaction conditions [4].

References:

1. J. Pfisterer, Y. Liang, O. Schneider, A.S. Bandarenka // **Nature** 549 (2017) 74
2. Y. Liang, D. McLaughlin, C. Csoklich, O. Schneider, A.S. Bandarenka // **Energy & Environmental Science** 12 (2019) 351
3. R.W. Haid, R.M. Kluge, Y. Liang, A.S. Bandarenka // **Small Methods** 5 (2021) 2000710
4. R.M. Kluge, R.W. Haid, I.E.L. Stephens, F. Calle-Vallejo, A.S. Bandarenka // **Physical Chemistry Chemical Physics** 23 (2021) 10051-10058

