# PROBING THE LOCAL INSTABILITIES IN THE LITHIUM-PROMOTED *CO* OXIDATION ON *Pt* BY $Li^+$ FIELD DESORBED IONS

Y. Suchorski[1], J. Beben[2], A. Frac[2], M. Schulz[1], V.K. Medvedev[3] and H. Weiss[1]
[1]*Chemisches Institut, Otto-von-Guericke-Universität Magdeburg, Universitätsplatz 2, D-39106 Magdeburg*
[2]*Institute of Experimental Physics Wroclaw University, pl. Maxa Borna PL50-204 Wroclaw, Poland*
[3]*Department of Chemical Engineering, University of Washington, Box 351750 Seattle, WA 98195-1750, USA*

Monitoring of the local ion rate of $Li^+$ field desorbed ions is utilised to study instabilities in the Li-modified catalytic CO oxidation on a Pt field emitter tip which serves as a model for the catalytically active metal particle of the supported catalyst. The "virtual probe-hole" approach is used which is based on the digitization of video-images obtained with a Li-FDM (Lithium Field Desorption Microscope, [1]). The "parallel" imaging principle of the Li-FDM allows to analyse simultaneously the variations of the local ion rate of $Li^+$ ions originating from various arbitrarily chosen regions of nm-size on the imaged surface. Local fluctuations during the different stages of the Li-modified CO oxidation reaction on different nano-facets of a [100]-oriented Pt-tip were recorded and analysed by correlation- and wavelet-analysis [2,3].

Noise-induced transitions between the active and the inactive branch of the reaction were observed using the $Li^+$ ions as probing species. The spatial extension of the noise-induced effects within the single nano-facets as well as the role of atomic steps have been directly proven.

The analysis of the local $Li^+$ ion rate fluctuations also provides the possibility to probe *in situ* the microscopic surface mobility of the Li atoms during a catalytic surface reaction by using the surface density fluctuation approach [2]. In the inactive branch of the reaction, where the Pt-surface is CO-covered, differences in the diffusions coefficient of Li/Pt(111) along and across the atomic steps were found.

The role of Li as a reaction modifier in the local oscillations and in the local "ignition" of the reaction as well the role of the local surface structure peculiarities as the pacemakers for the reaction instabilities are discussed.

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3. L. Prasad, S.S. Ivengar, S.S. Avengar, *Wavelet Analysis with Applications to Image Processing,* CRC Press, London, 1997.