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Prof. Mingshu Chen obtained his Bachelor of Science from Xiamen University, China, in 1982, Doctorat d'Etat (Docteur ès Sciences Physiques) from the Université Pierre et Marie Curie (Paris VI), France, in 1986. After one-year post-doctoral research in the Laboratoire d'Electrochimie Interfaciale du CNRS, France, he returned to China by the end of 1987, and served as associate professor and later full professor in 1991 at the Department of Chemistry of Xiamen University till now. The main research interests of Prof. Sun include Electrocatalysis, Electrochemical Surface Science, Spectro-electrochemistry, Nanomaterials and Chemical power sources. Prof. Sun has been elected Academician of Chinese Academy of Sciences in 2015, fellow of International Society of Electrochemistry (ISE) in 2007, and fellow of Royal Society of Chemistry (RSC) in 2005. He has been awarded the "Brian Conway Prize" from International Society of Electrochemistry (ISE), "Distinguished Contribution Award" from the Chinese Society of Electrochemistry, "Le prix Franco-Chinois 2014-2015" jointly from Société Chimique de France (SCF) and Chinese Chemical Society (CCS), and the State Natural Science Award (2nd Degree) of China. He is now editorial board member of Journal of Electroanalytical Chemistry, Functional Materials Letters, ACS Energy Letters, Electrochemical Energy Review, National Science Review and Journal of Solid State Electrochemistry, serving as associate editor to Electrochimica Acta, Spectral Analysis and Spectroscopy, Chinese Journal of Chemical Education, Acta Chimica Sinica, and editor-in-chief of the Journal of Electrochemistry.

Surface Chemistry and Model Catalysis Study

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Fundamental understanding of catalysts and how they function under the reaction conditions is the foundation for design high efficient catalysts and improved current catalytic conversion processes. Among such researches, *in-situ* studies on the model catalyst surfaces, as well as on the realistic catalysts, may provide more direct evidences of the structure ~ activity relationship, better understand the nature of the active sites. Metal oxide thin films grown on a refractory metal substrate are idea models for thoroughly investigating the structure and property of oxide supports and oxide catalysts. Moreover, it is also a prototype system to study the metal-support interaction, as well as the strong metal support interaction (SMSI). In this presentation, several model catalyst systems of oxide/metal were prepared, characterized and tested for typical oxidation and hydrogenation reactions. Modern surface techniques, including ambient pressure X-ray photoemission spectroscopy (APXPS)/ ultra violet photoemission spectroscopy (APUPS), high sensitivity low-energy ion scattering spectroscopy (HS-LEIS), Auger spectroscopy (AES), low-energy electron diffraction (LEED), scanning tunneling spectroscopy (STM), infrared reflection absorption spectroscopy (IRAS) were used. New development of *in-situ* IRAS with a spectral range of 4000~450 cm^{-1} is capable of measuring both the surface species and changes specific to the interface, providing useful information for metal-oxide interaction. A high efficient sample system was designed for analyzing the reaction products on the model surfaces.

References

1. M. S. Chen, X. V. Wang, L. H. Zhang, Z. Y. Tang, H. L. Wan, Active Surfaces for CO Oxidation on Palladium in the Hyperactive State, Langmuir 2010, 26, 18113.
2. M. S. Chen, Y. P. Zheng, H. L. Wan, Kinetics and active surfaces for CO oxidation on Pt-group metals under oxygen rich conditions, Topic Catal. 2013, 56, 1299.
3. Y. P. Zheng, L. H. Zhang, S. L. Wang, D. Ding, M. S. Chen, H. L. Wan, synergistic effects of VO_x/Pt(111) model surfaces for propane oxidation, Langmuir 2013, 29, 9090.
4. X. F. Weng, H. J. Ren, M. S. Chen, H. L. Wan, Effect of Surface Oxygen on the Activation of Methane on Palladium and Platinum Surfaces, ACS Catal. 2014, 4, 2598.
5. Y. H. Zhang, X. F. Weng, H. Li, H. B. Li, M. M. Wei, J. P. Xiao, Z. Liu, M. S. Chen, Q. Fu, X. H. Bao, Hexagonal boron nitride cover on Pt(111) - A new route to tune molecule-metal interaction and metal catalyzed reactions, Nano Lett. 2015, 15, 3616.
6. J. Hu, Y. Y. Song, J. J. Huang, Y. Y. Li, M. S. Chen, H. L. Wan, New Insights of the Role of Al_2O_3 in the promotion of CuZnAl catalysts: a Model Study, Chem. - A European J., 2017, 23, 10632.
7. Y.Y. Li, J. Hu, D. D. Ma, Y. P. Zheng, M. S. Chen, H. L. Wan, Disclosure of the Surface Composition of TiO_2 Supported Gold−Palladium Bimetallic Catalysts by High- Sensitivity Low-Energy Ion Scattering Spectroscopy, ACS Catal. 2018, 8, 1790.