Session of Focus Materialchemie – Wednesday, **06.03.2024** 16:00 – @ Seminarraum Lehar 01 (TU-Wien, Getreidemarkt 9, BC, OG. 01, A46) – join us on ZOOM (ID: 983 0066 2349)

Design and synthesis robust catalysts: A study trip from nanoparticulate catalyst to single atom alloy

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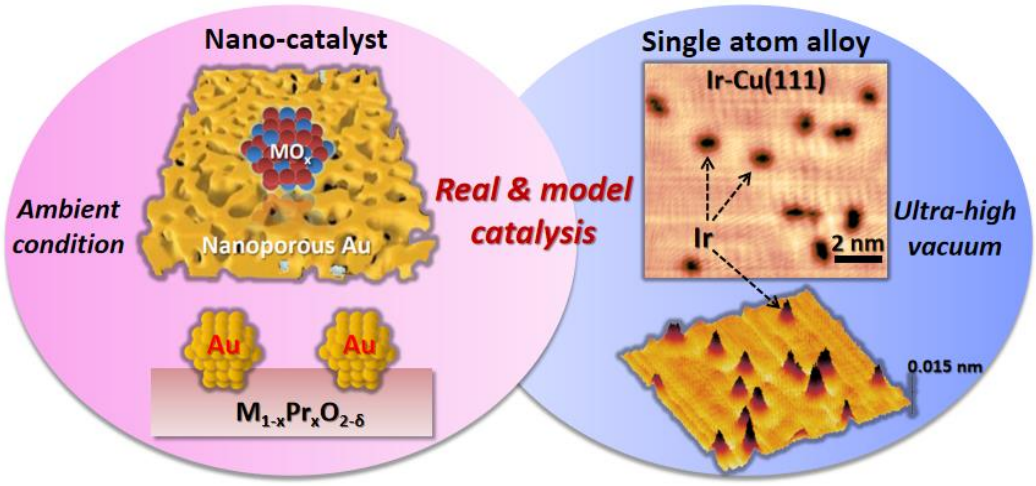
In this talk I will present my research work during my PhD study in Germany, lecturing work in China and postdoctoral research work in USA. It has ranged from the ambient condition based real catalysis to the ultra-high vacuum (UHV) based model catalysis. The catalysts I had studied were nanoporous gold supported metal oxides (CeO_x/npAu, Pr-TiO_x/npAu), rare-earth mixed metal oxides supported Au clusters (Au/$PrCeO_x$) and single crystal Cu(111) supported dilute alloy (Ti-Cu(111), Ir-Cu(111)) catalysts. The reactions I had studied included water gas shift reaction (WGSR), methanol reforming, ethanol deoxygenation and alkane activations. This study trip has witnessed the change of my research focus and also the change of the strategies for designing and synthesizing the robust catalysts for the targeting reactions. In general, it is from a relative large scale of nanoparticulate catalysts to a more precise scale of single atom alloy (or dilute alloys) catalysts.



The three catalysts system used in my research trip : (upper right figure) Nanoporous gold supported metal oxides (MO_x/npAu) ; (lower right figure) Rare-earth mixed metal oxides supported Au clusters (Au/$PrCeO_x$); (left side figure) STM images of single crystal Cu(111) supported dilute alloy catalysts (Ir-Cu(111)).

[1] J. Shi, Weaver et al., ACS Catalysis, 2023.
[2] J. Shi *, G. Rupprechter * et al., Applied Catalysis B: Environmental, 2022.
[3] J. Shi, Weaver et al., The Journal of Chemical Physics, 2021.
[4] J. Shi et al., Catalysis Science & Technology, 2021.
[5] J. Shi, M. Bäumer et al., Physical Chemistry Chemical Physics, 2019.
[6] J. Shi, M. Bäumer et al., Catalysis Science & Technology, 2016.
[7] J. Shi, M. Bäumer et al., The Journal of Physical Chemistry C, 2014.