FROM FeO TO FeO_2 AND Fe_2O: STRUCTURAL FLEXIBILITY OF IRON OXIDE ISLANDS AND FILMS ON Ru(0001)

Mikołaj Lewandowski
NanoBioMedical Centre, Adam Mickiewicz University Poznań, Poland
E-mail:lewandowski@amu.edu.pl

Ultrathin (< 1 nm-thick) iron monoxide (FeO) islands and films grown on Ru(0001) single-crystal support constitute well-defined model systems for studying elementary steps of catalytic reactions taking place over “inverse” metal-oxide catalysts. Thanks to the limited thickness of the oxide species and the possibility for the metals to occur in different oxidation states, such systems often exhibit superior structural flexibility when subjected to oxidizing or reducing conditions [1] (which are present during catalytic reactions).

Here, the results of scanning tunneling microscopy (STM), low energy electron diffraction (LEED), X-ray photoelectron spectroscopy (XPS), low energy electron microscopy (LEEM) and density functional theory (DFT) studies – performed by our group and our external collaborators – are presented, revealing the structural evolution of the FeO/Ru(0001) system upon exposure to oxidizing [2] and reducing conditions [3].

Acknowledgements

The studies were financially supported by the National Science Centre of Poland (SONATA 3 2012/05/D/ST3/02855 and PRELUDIUM 11 2016/21/N/ST4/00302 projects) and the Foundation for Polish Science (First TEAM/2016-2/14 (POIR.04.04.00-00-28CE/16-00) project co-financed by the European Union under the European Regional Development Fund).

References

[1] Lewandowski M. *et al.*, Catal. Today **181,** 52-55 (2012),
[2] Wang Y. *et al.*, Appl. Surf. Sci. **528,** 146032 (2020),
[3] Michalak N. *et al.*, http://arxiv.org/abs/2105.01229 (2021).