



Universiteit
Leiden

The Netherlands

A comparative study of platinum nanodeposits on HOPG (0001), MnO(100) and MnO_x/MnO(100) surfaces by STM and AFM after heat treatment in UHV, O₂, CO and H₂

Tsybukh, R.

Citation

Tsybukh, R. (2010, September 22). *A comparative study of platinum nanodeposits on HOPG (0001), MnO(100) and MnO_x/MnO(100) surfaces by STM and AFM after heat treatment in UHV, O₂, CO and H₂*. Retrieved from <https://hdl.handle.net/1887/15973>

Version: Corrected Publisher's Version

License: [Licence agreement concerning inclusion of doctoral thesis in the Institutional Repository of the University of Leiden](#)

Downloaded from: <https://hdl.handle.net/1887/15973>

Note: To cite this publication please use the final published version (if applicable).

Stellingen

behorende bij het proefschrift

A comparative study of platinum nanodeposits on HOPG (0001), MnO(100) and MnO_x/MnO(100) surfaces by STM and AFM after heat treatment in UHV, O₂, CO and H₂

1. A bimodal size distribution of metal nanoparticles may be the result of other sintering mechanisms than classical Ostwald ripening.
C. Africh, PhD. Thesis, Università degli studi di Trieste, Italy (2003).
2. The statement by Brülle and Stimming that HOPG has no effect on the lattice of deposited platinum is open to doubt in view of the recent findings by Kondo et al.
T. Brülle, U. Stimming, J. Electroanal. Chem. 636 (1-2), 10-17 (2009).
T. Kondo, K. Izumi, K. Watahiki, Y. Iwasaki, T. Suzuki and J. Nakamura, J. Phys. Chem. C 112 (40), 15607-15610 (2008).
3. In the coming years because of its atomic resolution capability dark field scanning transmission electron microscopy can outperform scanning probe microscopy in the investigations of supported catalysts.
T. Akita, K. Tanaka, M. Kohyama, J. Mater. Sci. 43, 3917-3922 (2008).
4. Doping of a HOPG surface might provide a route of enhancing its catalytic properties as a support material for metal catalysts and preventing the sintering of the nanometer-sized catalyst particles. In addition, it may contribute to the understanding of the interaction between nanoparticles and graphite supports.
M. Endo, T. Hayashi, S.-H. Hong, T. Enoki, M. S. Dresselhaus, J. Appl. Phys. 90, 5670 (2001).
Y. Zhou, T. Holme, J. Berry, T. R. Ohno, D. Ginley, R. O'Hayre, J. Phys. Chem. C 114 (1), 506-515 (2010).

5. Heat treatment of supported metal catalysts in different gas atmospheres is a viable approach for the production of nanoparticles with tailored physico-chemical properties.

*K. J. J. Mayrhofer, V. Juhart, K. Hartl, M. Hanzlik, M. Arenz, Ang. Chem., Int. Ed. **48** (19), 3529-3531 (2009).*

[Chapter 4 of this thesis]

6. Platinum oxides can play a central role in the sintering of platinum deposits under oxidizing conditions.

[Chapter 4 of this thesis]

7. Advance in the research of manganese oxides and their surfaces will contribute to the development of more effective oxygen storage systems.

[Chapter 5 of this thesis]

8. The explanation by Higuchi *et al.* that the segregation of Mn_3O_4 crystallites out from stoichiometric LaMnO_3 films occurs due to the accommodation of a net cation off-stoichiometry during growth might also be applicable in the case of the annealing of a MnO single-crystal.

*T. Higuchi, T. Yajima, L. Kourkoutis, Y. Hikita, N. Nakagawa, D. Muller, H. Y. Hwang, Appl. Phys. Lett. **95** (4), 043112 (2009).*

[Chapter 5 of this thesis]

9. Since we cannot know all that there is to be known about anything, we ought to know a little about everything.

Blaise Pascal

10. The probability of getting fine images by scanning probe microscopy is inversely proportional to the position of the Sun above the horizon.

Roman Tsybukh

L'viv, 25 May 2010