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Surface-structure dependence of water-related adsorbates on platinum

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Propositions

Accompanying the thesis:

Surface Structure Dependence of Water Related Adsorbates on Platinum

1. Temperature programmed desorption is the beauty and beast of surface kinetics (KW Kolansinski). Its simplicity does the wonders for the quick and accurate kinetic analysis. The beast comes into the light when interpreting the data, (Chapter 2).
2. Pt(211) is often taken as the reference for (100) step edge effects in theoretical studies because it is the smallest unit cell containing this particular step type. A great caution is required when generalizing results from theoretical studies based on this smallest unit cell containing the (100) step edge to catalysis by actual particles, (Chapter 4).
3. Artists and scientists are more alike than different. They do not seek out what is there, they do seek out what is not there.
4. When water is adsorbed on colder surfaces (< 120 K), it forms metastable amorphous solid water (ASW) which crystallizes into crystalline ice (CI) when heated. The step geometry, even for nearly identical surfaces, significantly influences the wetting behavior of water causing different desorption kinetics for ASW and CI, (Chapter 5).
5. The desorption kinetics and the water structure is not affected by post-deuteration. However, for pre-deuterated surface our kinetic analysis suggests a new CI phase. This new phase has identical desorption kinetics with the CI grown on Pt(111), (Chapter 6).
6. (110) step defects on pre-deuterated Pt[n(111)x(100)] samples can be revealed to an extent as low as 1 % or lower, (Chapter 6).
7. (100) stepped Pt(111) surfaces exhibit high reactivity at low oxygen coverages ($\cong 0.6$ ML), however, the reactivity decreases with increasing coverage. On the other hand, (110) stepped Pt surfaces require more oxygen to achieve the high reactivity but they maintain the high reactivity up to higher coverages, (Chapter 7).
8. Truth cannot be determined by the vote of the majority. In some cases, majority may pose a serious threat to certain fundamental rights such as freedom and justice. Nobody should fear the tyranny of the majority.

Cansin Badan
Leiden, November 22 2016