A CHEMICAL REACTION AS A TRIGGER FOR NANOSTRUCTURE FORMATION ON A SILVER SURFACE.

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Oxygen adsorption on the (110) face of silver has been one of the most studied system, particularly interesting for two reasons: i) it is very reactive and an excellent oxygen provider for the oxidation of many molecules, ii) the O(nx1)-Ag(110) reconstructed surface provides a nice nano-structured template for the formation of layers of reacting molecules. Its reaction with water has attracted much attention in the past [1-5] as formation of stable and long range ordered hydroxyl layers has been evidenced and more recently some further insights has been gained by STM measurements [6, 7].

We will present results of our STM investigation of water interaction with an oxygen covered Ag(110) on the example of the O(4x1) reconstructed surface and show how they point to a more complex reaction dynamics than previously described. Indeed the new feature revealed by this local probe study, is the formation of quasi-rectangular islands evenly distributed across the terraces for temperatures below 230K. These features are attributed to silver islands of mono-atomic height, formed by clustering of silver ad-atoms released during reaction of the O atoms with the water molecules.

We also performed real time STM measurements during the water dosing, at two temperatures (200K and 240K), to monitor the modifications induced at the surface. We will present and discuss the drastic differences evidenced in the reaction dynamics at these two temperatures.

References

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