

The use of supersonic molecular beams in state resolved surface science experiments : interaction with well defined defects and stereodynamics via rotational alignment.

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**Lundi 11 septembre à 15h00
Amphi Pavillon d'Accueil Soleil**

Supersonic molecular beams represent a powerful tool for studying gas-surface interaction and simple catalytic reactions in the heterogeneous phase. I will show two possible applications concerning the possibility to study the role of well defined steps and other defects in surface reactivity and the possibility to align the gas phase molecules in given rotational states. In the first case one exploits the directionality of the beam which allows to select the angle of impact of the gas phase molecules. I will show that nanosized Ag terraces are less reactive than extended terraces and that subsurface incorporation of O is more facile along particular trajectories. In the second case one uses the anisotropic rotational cooling occurring in the expansion of molecules seeded in a lighter carrier gas. The high speed tail consists thereby nearly exclusively of molecules in low helicity states while the slow tail is made up of statistically distributed molecules. With respect to normal incidence onto the surface and for the typically low angular momenta of the beam molecules ($J=1$) this corresponds to cartwheeling molecules in the first case and to mostly helicoptering ones in the second. Our data show that rotational alignment causes anisotropies in the sticking probability [1] as well as in simple oxidation reactions. Examples will be give for the oxidation of stepped Ag and Cu surfaces, for hydrocarbon adsorption on Ag and Pd and for CO oxidation on Pd(100).

[1] L. Vattuone, A. Gerbi, M. Rocca et al. *Angewandte Chemie* 43, 5200 (2004)

Formalités d'entrée : accès libre dans l'amphi du Pavillon d'Accueil. Si la manifestation a lieu dans le Grand Amphi Soleil du Batiment Central, merci de vous munir d'une pièce d'identité et de prévenir le secrétariat en charge de l'événement.

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