

ADSORPTION SITE-DEPENDENT DIFFUSION OF AZOBENZENE ON Cu(110)

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The adsorption of molecules on surfaces plays an important role in bottom-up nanofabrication. It is therefore essential to understand the influence of the surface on fundamental chemical processes, such as conformational changes and reactions [1]. Studies of azobenzene and derivatives thereof are particularly interesting for nano-electronics since these molecules are considered as model-systems for molecular switches, based on light induced reversible *trans-cis* isomerizations. However, the study of these prototypical molecules under well-defined ultra-high vacuum (UHV) conditions are only just emerging [2-4]. These findings could greatly enhance our knowledge on the transferability of the switching properties that these single molecules undergo when adsorbed at surfaces.

Here we present our recent findings on the adsorption site dependent diffusion of azobenzene on the Cu(110) surface [2]. The *trans*-isomer was observed and found to occupy two adsorption geometries – an energetically stable and a metastable state. We show for the first time that the *trans*-isomer spontaneously adopts a metastable adsorption geometry. Diffusion occurred along the closed-packed direction of the surface and the diffusivity for the two adsorption states was found to differ by approximately one order of magnitude.

Moreover, our results demonstrate a moderately strong molecule-surface interaction [3] in this system, suggesting that the copper surface could be a highly relevant substrate for future studies into the photo-isomerization of adsorbed azobenzene.

References:

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- [4] J. Henzl, M. Mehlhorn, H. Gawronski, K.-H. Rieder, K. Morgenstern, *Angew. Chem. Int. Ed.* **45** (2006) 603.

Figures:

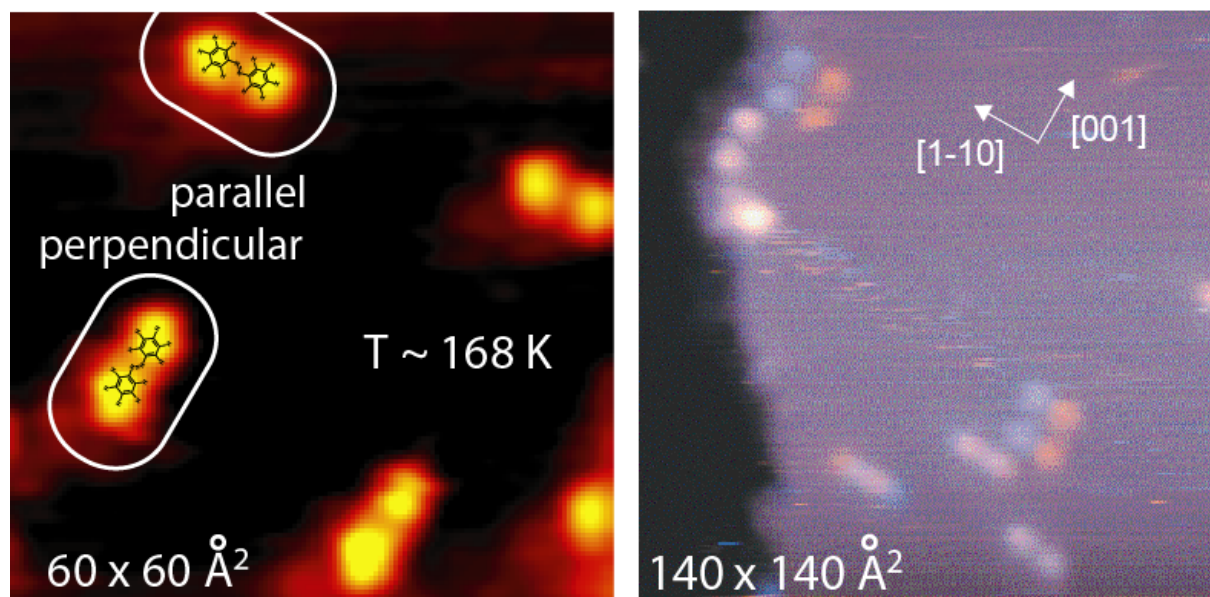


Figure 1 Both the energetically stable (parallel) and metastable (perpendicular) adsorption geometries of azobenzene (left) are shown. Two time-lapsed superimposed STM images demonstrate diffusion of both adsorbed species along the $[1-10]$ direction (right).