



europhysics  
conference  
abstracts

8th European Conference on

# ***Surface Science (ECOSS-8)***

Kernforschungsanlage Jülich

14 – 17 April 1986

## ***Invited and Contributed Papers***

Editor: H. Bonzel, Jülich

Under the auspices of the  
International Union of Vacuum Science, Technology and Its Applications  
and the European Physical Society

Published by: European Physical Society

Series Editor: Prof. S. Methfessel, Bochum

Managing Editor: G. Thomas, Geneva

**VOLUME  
10B**

CO<sub>2</sub> adsorption and CO<sub>2</sub>/O coadsorption and reaction on Ni(110): an angle-resolved photoemission study.

B. Bartos und H.-J. Freund

Institut für Physikalische und Theoretische Chemie, Universität Erlangen-Nürnberg

H. Kühlenbeck und M. Neumann

Fachbereich Physik, Universität Osnabrück

Utilizing the synchrotron radiation from the BESSY storage ring we have studied photoemission from CO<sub>2</sub> adsorbates on a Ni(110) surface. At ~ 80 K CO<sub>2</sub> adsorbs molecularly in a "side-on" geometry as judged from angle dependent intensity variations. We observe dispersions of CO<sub>2</sub> levels indicating the formation of a band structure of an ordered system (in agreement with preliminary LEED studies showing streaks along the (100) direction). The magnitude of the dispersion of the CO<sub>2</sub> 4σ<sub>g</sub>-level is larger along the (110) than along the (100) direction.

Between ~ 100 K and 300 K the spectrum changes continuously, and at ~ 300 K CO is formed. Theoretical calculations suggest that a bent CO<sub>2</sub> species formed at intermediate temperatures causes the spectral changes.

If 0.3 L O<sub>2</sub> is preadsorbed, CO<sub>2</sub> adsorbs in a "side-on" geometry. The stability of CO<sub>2</sub> in the coadsorbate is greater than in the pure CO<sub>2</sub> adsorbate, as indicated by a higher decomposition temperature. The spectrum of the decomposed coadsorbate is compatible with a CO/O coadsorbate, in which the electronic structure of the coadsorbed CO is altered as compared to a pure CO adsorbate.