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UV-LASER-INDUCED PHOTODESORPTION OF NO FROM NiO

P.M. FERM *, F. BUDDE **, A.V. HAMZA ***, S. JAKUBITH, G. ERTL

Fritz-Haber-Institut der Max-Planck-Gesellschaft, 1000 Berlin 33, Germany

D. WEIDE, P. ANDRESEN

Max-Planck-Institut für Strömungsforschung, 3400 Göttingen, Fed. Rep. of Germany

and

H.J. FREUND

Institut für Physikalische Chemie, Ruhr-Universität, 4630 Bochum, Fed. Rep. of Germany

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Irradiation of a NO covered NiO surface by UV photons ($h\nu = 5.0$ and 6.4 eV, respectively) yields desorption with a quantum yield of the order 10^{-2}. Fully state-resolved determination of the energy distributions of the desorbing particles were performed by means of laser-induced fluorescence and demonstrated the non-thermal origin of at least part of them. Bimodal velocity distributions, a pronounced spin–orbit selectivity for molecules with low rotational levels, and an increase of the mean translational energy with increasing rotational energy are the most remarkable effects observed. The results are qualitatively discussed on the basis of current concepts for desorption via electronic excitation and for scattering of open-shell molecules at surfaces.

1. Introduction

Processes such as laser-induced chemical vapour deposition, laser etching or laser ablation are of growing interest with respect to application in microelectronics [1–5] and comprise the variation of the chemical state of a surface by irradiation with laser light. In many of these laser-assisted processes, thermal and non-thermal (i.e. photochemical) pathways are conceivable, but mostly the exact mechanisms are still unknown.

* Present address: Allied-Signal Inc., Engineered Materials Research, Morristown, NJ 07960, USA.

** Present address: IBM Thomas J. Watson Research Center, Yorktown Heights, NY 10598, USA.

*** Present address: Sandia National Laboratories, Surface Science and Chemical Physics Division, Livermore, CA 94550, USA.