The Surface Structure of Model Catalyst in Action Investigated by X-ray Diffraction

S. Ferrer[(1)], Marcelo D. Ackermann[(2,3)], O. Robach[(4)], B.L.M. Hendriksen[(3)], I. Popa[(2)], J. Frenken[(3)], *[(1)]ALBA Edifici Ciències, C-3 central, UAB, 08193 Bellaterra, Spain. [(2)]Kamerlingh Onnes Laboratory, Leiden University, PO Box 9504, 2300 RA Leiden. [(3)]ESRF, 6, rue Jules Horowitz, F-38043 Grenoble cedex, France. [(4)]CENG-CEA, Avenue des Martyrs, F-38043 Grenoble cedex , France.* E-mail: ferrer@cells.es

There are few techniques which allow to investigate surfaces at atmospheric pressures. One of them is surface x-ray diffraction which has detection limits of adsorbed gases bellow one atomic layer. The talk will describe experimental results on the adsorption of CO , H_2 and their reaction to form methane on a Ni (111) single crystal surface in a range of pressures from Ultra High Vacuum to 1 bar. The important role of surface carbide will be discussed . Also, results on the oxidation of CO to CO_2 on Pt(110) surfaces at atmospheric pressures will be reported . The experiments show that Pt oxides are better catalysts than pure Pt and that metastable oxides are formed under reaction conditions.

Keywords: synchrotron x-ray diffraction, heterogeneous catalysis, adsorption