Chemisorption of N_2O and H_2 for the Surface Determination of Copper Catalysts

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Dedicated to P rofessor Dr. Manfred Baerns on the occasion of his 65th birthday

1 Introduction

Metal surface areas are usually determined by selective chemisorption of a suitable probe molecule (e.g. CO, H_2, O_2). A lot of experimental techniques for the determination of Cu metal areas cited in the literature are based on the dissociative chemisorption of nitrous oxide [1–7]. In this contribution, a comparison of different methods using N_2O as a probe molecule is presented. The experiments comprise isothermal N_2O flow experiments, transient decomposition experiments and the pulse flow chemisorption of N_2O in an He carrier stream. The main object of these experiments was to clarify the influence of the reaction parameters (temperature, contact time, sample mass, etc.) on the specific Cu surface area determined. As a further independent method for the determination of Cu surface areas the temperature-programmed desorption of hydrogen (H_2 TPD) has been applied [8,9].