DETAILED STRUCTURE OF Au-INDUCED Si(11 11 13) SURFACE RECONSTRUCTION

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Evolution of Au-induced reconstruction on vicinal Si(11 11 13) surface is studied by scanning tunneling microscopy (STM). We find that clean Si(11 11 13) surface is composed of (111)-(7x7)-like parallel terraces with width close to (7x7) unit cell size. The terraces are separated by monoatomic steps. At coverage of 0.3 ML of Au the surface splits into stripes with (7x7) reconstruction and patches of 3.89 nm wide parallel terraces. Fully ordered, uniform Si(11 11 13) surface is observed for Au coverage of about 0.48 ML. At this coverage the surface is composed of only parallel chain-like structures, 3.89 nm wide. High-resolution STM measurements revealed that in this case stripes of the (5x2)Au reconstruction coexist with other highly ordered onedimensional features. For larger Au coverage the surface splits again into wide (111) stripes with ($\sqrt{3}$ x $\sqrt{3}$) reconstruction. We demonstrate that optimum uniformity and ordering on the Si(11 11 13) surface can be achieved only for narrow range of Au coverages, and proper annealing sequence. A crucial role of formation of the one-dimensional atomic chains on regularly spaced terraces and its relevance to the (5x2)Au reconstruction is stressed.

CERIA PROMOTED CO OXIDATION ON Pt(111): KINETIC PHASE DIAGRAMS

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Recently, a novel CeO_x/Pt(111) model catalytic system of the "inverse supported catalysts" type has been fabricated using self-assembling of Ce adatoms on Pt(111) surface with a subsequent partial oxidation of the nucleated Ce submonolayer [1]. The activity of this CeO_x/Pt(111) system in the CO oxidation reaction has been investigated. In comparison to the clean Pt(111) surface, an enhanced reactivity and a remarkable shift of the bistable region of the reaction towards higher CO pressures were observed.

In the present contribution we combine the observed phenomena in kinetic phase diagrams where the regions of monostability and bistability are shown for varying external parameters (pCO, pO2, T). The principal possibility to control the reactive phase diagram of the CeO_x-promoted CO oxidation on Pt by varying the coverage and morphology of CeO_x as well as the usefulness of such a type of model catalyst for the investigation of the redox behaviour of ceria in ceria-Pt catalysts is demonstrated.

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