low-defect growth, high aspect ratio and rather high spacing between adjacent chains. This system seems to be a possible candidate for the formation of a Luttinger liquid.

Assuming a c(8x2) translational symmetry we propose several models of Au chain structures. They are investigated in the framework of a density functional theory approach. For each model, different features including surface energy, STM images, band structure, etc. are calculated. The computed properties are compared to experimental data and used to evaluate the different models.

[1] J. Schäfer, C. Blumenstein, S. Meyer, M. Wisniewski, and R. Claessen, Phys. Rev. Lett. 101, in press (Dec. 2008).

O 42.29 Wed 17:45 P2

Large Area Growth of Pt-induced Atomic Nanowires on Ge(001) — •Sebastian Meyer[1], Kathrin Roensch[1], Marc Wisniewski[1], Christian Blumenstein[1], Jörg Schäfer[1], Andrej Stekolnikov[2], Fiedhelm Bechstedt[2], and Ralph Claessen[1] — [1]Physikal. Institut, Universität Würzburg, 97074 Würzburg — [2]Inst. f. Festkörpertheorie u. -optik, Universität Jena, 07743 Jena

The structural properties of atomic nanowires are closely affecting both self-organized growth and resulting conduction behavior. A fascinating case are Pt nanowires on the Ge(001) surface. A dimerization along the chains observed in scanning tunneling microscopy (STM) is reminiscent of a charge density wave. However, sideways dimer elements also exist, which indicate dimerized back-bonds. Near the Fermi level, dimerization is not observed, and a spatially rather uniform charge density exists. It is consistent with metallic character at room temperature, as is confirmed by tunneling spectroscopy. Concerning the bonds involved, rather high substrate temperatures (∼700 °C) are needed to initiate large-area growth. The experimental findings can be understood within a structural model obtained from ab-initio simulation [1]. It turns out that Pt-Ge bonds are favored. Moreover, the prominent dimerization along the chain is explained by Ge dimers rather than Pt ones. Instead, the metal atoms are incorporated as chain of alternating Pt and Ge atoms adjacent to the top ridge. Such complex bond rearrangement makes it plausible that high activation energies are needed for a structural reorganization.

[1] A. A. Stekolnikov et al., Phys. Rev. Lett. 100, 196101 (2008).

O 42.30 Wed 17:45 P2

Suppression of phase transition by doping: atomic Pb chains on Si(557) — Marcin Czubanowski, •Melani Gauch, Christoph Tegenkamp, and Herbert Pfnür — Leibniz Universität Hannover, Festkörperphysik, Abteilung Oberfächen

The adsorption of Pb on Si(557) substrate leads to the formation of anisotropic metallic structures as reveal by conductivity measurements, SPA-LEED and ARPES. The annealing of at least 1.3ML Pb at 640K forms atomic chain structure within a (223) facet, which shows below $T_c = 78K$ a metallic conductance along the wires, whereas the perpendicular direction is insulating. As revealed by ARPES and LEED, the interplay between the filling of the surface bands, determined by the Pb coverage, and the reciprocal lattice vector, defined by the inter-chain spacing, results below T_c in a perfect nesting condition. Due to a temperature driven refaceting transition, the system switches into a 2d regime, where conductivity is seen in both direction. In our recent experiments, the influence of additional Pb atoms on the phase transition at T_c has been investigated by means of SPA-LEED. The electronically stabilized system at 1.3ML has been doped by a small amount of addition Pb (in steps of 0.01ML). The structural phase transition is gradually suppressed as the coverage reaches 1.5ML. As judged from SPA-LEED the excess coverage starts to decorate the steps, obviously changing the filling factors of the surface states.

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Surface Photo Voltage and Local Work Function Variations of Nanostructures on Si(111) measured by STM — •Kristian Sell, Ingo Barke, Stefan Polei, Viola von Oeynhausen, and Karl-Heinz Meiwes-Broer — Universität Rostock, Institut für Physik, 18051 Rostock, Germany

We present surface photo voltage (SPV) and local work function (LWF) measurements of Si(111)5x2-Au atomic chains and deposited clusters on a Si(111)7x7 surface. Quantitative results are obtained from spatially resolved I(V) spectra. On a Si(111) surface partially covered by the quasi one-dimensional Si(111)5x2-Au structure we determine the SPV as a function of laser power at different locations. Based on these results we establish and discuss a simple model for the band bending which leads to LWF variations on a sub-nanometer scale. This model is confirmed by spatially resolved LWF measurements using I(Z) spectroscopy. In addition we present preliminary SPV measurements on clusters produced in an arc cluster ion source (ACIS) and deposited on Si(111)7x7.

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Field Emission Resonances on Junctions between Si(111)7x7 and Si(111)5x2-Au — •Stefan Polei, Ingo Barke, Kristian Sell, Viola v. Oeynhausen, and Karl-Heinz Meiwes-Broer — Institut für Physik, Universität Rostock, Universitätsplatz 3, D-18051 Rostock

The image state derived field emission resonances (FER) are investigated on a Si(111)7x7 substrat which is partially covered by the quasi one-dimensional Si(111)5x2-Au structure. These states can be observed by dI/dV measurements of the unoccupied energy range if the STM is operated in a field emission mode. A shift of the FER peak positions on Si(111)7x7 patches vs. Si(111)5x2-Au patches is found which happens on a scale of one nanometer. The origin of that shift is attributed to work function differences [1] caused by the different Fermi level pinning. The results are discussed in view of local work function changes determined by I(Z) spectroscopy across a (7x7)-(5x2-Au) junction.

[1] H. C. Ploigt, C. Brun, M. Pivetta, F. Patthey, and W. D. Schneider, Phys. Rev. B 76, 195404 (2007).

O 42.33 Wed 17:45 P2

Investigation of self-sustained molecular wires by STM — •Kerrin Dössel[1], Maya Lukas[1], Alexandrina Stuparu[1], Christophe Stroh[1], Marcel Mayor[1,2], and Hilbert v. Löhneysen[3,4] — [1]Forschungszentrum Karlsruhe, Institut für Nanotechnologie, D-76021 Karlsruhe — [2]Universität Basel, Department of Chemistry, CH-4056 Basel — [3]Universität Karlsruhe, Physikalisches Institut, D-76128 Karlsruhe — [4]Forschungszentrum Karlsruhe, Institut für Festkörperphysik, D-76021 Karlsruhe

In recent years the electronic structure and in particular the conductance of organic molecules have been investigated in a growing number of experiments. A method frequently used to measure molecular conductance is the mechanically controlled break junction (MCBJ) technique. However, in MCBJs the nature of the contact of the molecule to the electrodes is not known. Theory is thus lacking important information to exactly model and thus understand molecular conductance. It is therefore desirable to fully characterize molecular wires which are binding stably to the electrodes. We investigate self-sustained molecules, that are designed to stand upright on a conducting substrate, which serves as one electrode, while the head-group is sticking out freely from the surface, accessible by the tip of our UHV STM. We used STM and STS to investigate the molecules' position and surrounding on the surface, the bond to the surface and the electronic properties of our tripodal molecules on several metallic surfaces at low temperature (30K).

O 42.34 Wed 17:45 P2

Growth of horizontally aligned carbon nanotubes on single crystalline surfaces — •Florian Szillat, Hans Kleemann, Philipp Zeigermann, Michael Blech, Mathias Steglich, and Bernd Schroeter — Universitaet Jena, Institut fuer Festkoerperphysik, Max-Wien-Platz 1, 07743 Jena, Deutschland

A controlled growth of aligned carbon nanotubes with particular structural and electronic properties at predefined positions is a prerequisite to utilize them in electronic or nanooptical devices. Alignment could be reached by applying electric fields during growth via chemical vapor deposition or by using single crystalline substrates. In the latter case the anisotropic arrangement of the surface atoms create an intrinsic electric field. An easy and fast way to analyze the crystallographic orientation of the substrate is the use of electron channeling pattern. The metal catalyst is deposited and prestructured at the substrate surface to support the aligned growth of CNTs. The carbon nanotubes are produced by catalytic chemical vapor deposition using ethanol or methane as precursor gas. The quality of these nanotubes is tested by raman and x-ray spectroscopy. Morphology and orientation of the nanotubes are characterized by scanning electron and atomic force microscopy.

O 42.35 Wed 17:45 P2

Oxide formation on reconstructed Au(110) surfaces — •Marc Landmann, Eva Rauls, and Wolf Gero Schmidt — Lehrstuhl für Theoretische Physik, Universität Paderborn