

VA 2: Ultra-high vacuum UHV

Time: Monday 12:15–12:55

Location: HSZ 101

VA 2.1 Mon 12:15 HSZ 101

New Methods to Achieve UHV/XHV with Refrigerator Cooled Cryopumps — •DIETER MÜLLER — Oerlikon Leybold Vacuum GmbH, Köln, Deutschland

Besides being absolutely hydrocarbon-free, refrigerator-cooled cryopumps have unmatched pumping efficiency for water vapor among all high vacuum pumps. Thus we recommend them to use in UHV/XHV systems even during bakeout. The thermal balance of cryopumps in vacuum systems during baking is discussed and modifications of commercial pumps to withstand the heat flux into the pump are discussed. Practical results are shown reaching XHV pressures below $1\text{E-}12$ mbar.

VA 2.2 Mon 12:35 HSZ 101

AFM, STM and Atom Probe study on vacuum fired 316 LN stainless steel — PAUL FRANK¹, LARS WESTERBERG², and •MANFRED LEISCH¹ — ¹Institut für Festkörperphysik, TU Graz, 8010 Graz, Austria — ²Department of Physics, Uppsala University, SE 751 21 Uppsala, Sweden

Stainless steel is one of the most used construction materials in vacuum technology. In order to reduce the outgassing of hydrogen a high temperature treatment (vacuum firing) is a common used method especially in XHV applications. Since the outgassing process is strongly related to surface morphology the surface of grade 316 LN stainless steel, after low temperature bake-out process and vacuum annealing, has been studied by atomic force microscopy (AFM) and scanning tunnelling microscopy (STM). The local elemental composition on the surface before and after thermal treatment has been investigated by atom probe (AP) depth profiling measurements. After vacuum annealing AFM and STM show distinct changes in the surface structure and topology. Compared to previous studies on grade 304 L stainless steel recrystallisation and surface reconstruction is less pronounced on the 316 LN material. AP depth profiling analyses result in nickel enrichment on the surface. Since hydrogen recombination is almost controlled by surface structure and composition the experimental results will be discussed with respect to the influence on the outgassing behaviour.

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