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Ultrathin TiO_x films on Pt(111) GAETANO GRANOZZI, FRANCESCO SEDONA, Dept. of Chemical Sciences, University of Padova, KLAUS SCHIERBAUM, Heinrich-Heine-Universität Düsseldorf — Ultrathin ordered titanium oxide films on Pt(111) surface were prepared by reactive evaporation of Ti in oxygen. By varying the Ti dose and the annealing conditions, several long-range ordered phases were obtained and characterized by means of LEED, XPS, UPS, photoelectron diffraction, STM and XAS. XPS and photoelectron diffraction data indicate that all the phases, except two, are one-monolayer thick and composed of a Ti-O bilayer with interfacial Ti. Atomically resolved STM images of all the prepared phases have been obtained. At a low Ti dose (0.4 MLE), an incommensurate *kagomé*-like low density phase is observed where hexagons are sharing their vertices. At a higher Ti dose (0.8 MLE) two denser phases are found, both characterized by a zigzag motif, but with distinct rectangular unit cells. When the post-annealing of the 0.8 MLE deposit is carried out at high temperatures and oxygen partial pressures, an incommensurate non-wetting fully oxidized phase is found, whose symmetry and lattice dimensions are almost identical with those observed in the system VO_x/Pd(111). At higher coverage, two commensurate hexagonal phases are formed, which show wagon-wheel-like structures and have slightly different lattice dimensions. Competitively to the formation of ultrathin films, nanosized TiO_2 crystallites can grow on top of the surface. They predominate the entire morphology only for large initial Ti deposits.

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