

Abstract Submitted
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Oxides on Nanoscale Platinum Surfaces¹ DANIEL HENNESSY, Materials Science Division, Argonne National Laboratory, VLADIMIR KOMANICKY, Safarik University, UPJŠ, Košice, Slovakia, MICHAEL S. PIERCE, KEE-CHUL CHANG, HOYDOO YOU, Materials Science Division, Argonne National Laboratory — We demonstrate the existence of oxide layers on nanoscale Pt interfaces annealed in an oxygen environment. The sample is a Pt single crystal cut at the midpoint between the 100 and 111 crystal directions; annealing in Ar produces a smooth surface, while annealing in air produces ~ 10 nm-sized 100 and 111 facets. Synchrotron x-ray crystal truncation rod (CTR) measurements indicate a bilayer Pt oxide structure on the nanofacets. Fitted Pt occupancies are consistent with a nearest-neighbor avoidance structure of the surface oxygen atoms. Electrochemical cycling of the faceted surface in CO-saturated solution removes the oxide and leaves clean, ordered facets. Pt single crystals of 100 and 111 surface orientations prepared the same way did not support an oxide layer.

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