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Faceting and defaceting phase transitions of Pd/W(111) YU-WEN LIAO, Natl. Taiwan Univ., Taiwan and Inst. of Atomic and Molecular Sciences, Taiwan , L.H. CHEN, K.C. KAO, Natl. Central Univ., Taiwan, MINN-TSONG LIN , Natl. Taiwan Univ., Taiwan and Inst. of Atomic and Molecular Sciences, Taiwan , CHENG-HSUN NIEN, Natl. Central Univ., Taiwan , KER-JAR SONG , Inst. of Atomic and Molecular Sciences, Taiwan — We have studied the faceting and the defaceting phase transitions of the Pd/W(111) surface. Our studies show that for creating the largest facets, the best annealing temperature is right below the defaceting transition temperature, confirming the prediction by Oleksy (Surf. Sci. 549 (2004) 246). As we vary the programmed heating/cooling rate from 1/8 to 8 K/s, the paths of faceting transitions show normal retardation effect and shift to lower temperatures as the cooling rate increased. Surprisingly, the paths of defaceting transitions show negligible dependence on the heating rate. Detailed studies of this peculiarity lead us to propose that the defaceting transition is initiated at places subject to loss of too much Pd due to thermal desorption. As such loss can more readily be replenished at places near any one of the Pd 3-d islands, we propose that the rate independent path of defaceting transition is the consequence of a temperature dependent balance between the loss and the supply of Pd. Such balance should depend on the density of the Pd islands. Indeed, we find the paths of defaceting transition can be shifted to lower temperature by reducing the density of the Pd 3-d islands.

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