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Faceting of Re ($11\bar{2}1$**) induced by ammonia**[1] HAO WANG, WENHUA CHEN, THEODORE E. MADEY, Dept. of Physics and Astronomy, Rutgers University, Piscataway, NJ 08854, TIMO JACOB, Fritz-Haber-Institut der MPG, Berlin, Germany — The ammonia-induced nanoscale faceting of Re ($11\bar{2}1$) has been studied by LEED and STM; the results are compared with recent studies of O-induced faceting of Re($11\bar{2}1$). After exposure to ammonia at 700K, the Re($11\bar{2}1$) surface only shows a (1×2) reconstruction and remains planar (ammonia dissociates on Re, and only N remains on the surface at T>700K). By exposure to ammonia at 900K, Re($11\bar{2}1$) becomes completely faceted, forming 2-sided ridge-like structures with ($13\bar{4}2$) and ($31\bar{4}2$) facets. However, this morphology is different from that in O-induced faceting of Re($11\bar{2}1$). The two ridge sides, ($13\bar{4}2$) and ($31\bar{4}2$), are vicinal surfaces of closed-packed ($01\bar{1}0$) and ($10\bar{1}0$) respectively; these latter two surfaces appear as facets in O-induced faceting of Re($11\bar{2}1$). DFT calculations are implemented to understand the origin of the different morphologies. Our work demonstrates that it is possible to tailor the surface morphology by choosing appropriate adsorbate and annealing conditions, which in turn provides model systems to study structural sensitivity in catalytic reactions as well as potential templates to grow nanostructures.

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