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Preferential Nucleation and Growth of Au Particles on faceted O/Ru($11\bar{2}0$) Nanotemplate[1] QUANTONG SHEN, WENHUA CHEN, ROBERT BARTYNSKI — Preferential nucleation and growth of Au nanoparticles on a faceted O/Ru($11\bar{2}0$) nanotemplate is investigated by low energy electron diffraction (LEED), scanning tunneling microscopy (STM), and Auger electron spectroscopy (AES). The nanotemplate is fabricated on Ru($11\bar{2}0$)upon annealing in NO_2 at sample temperatures $\geq$ 650K. The faceted substrate consists of uniform long ridges running along [0001] direction with four facets ($10\bar{1}1$), ($01\bar{1}1$), ($10\bar{1}\bar{1}$), and ($01\bar{1}\bar{1}$) on the ridges, with typical dimensions of $\sim$ 6 nm wide. Deposition of Au onto this nanotemplate at room temperature results in preferential nucleation and growth of Au particles with a narrow size distribution within the valleys of the nanofaceted surface. The size of Au nanoparticles can be changed by varying Au coverage. Our work demonstrates that the nanofaceted metal surface is a promising model for future studies of different substrates and metallic overlayers more relevant to catalytic reactions.

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