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The Physical Character of the Au (001) Surface Reconstruction in the Presence of CO and O2[1] ANDREW LOHEAC, MICHAEL S. PIERCE, Rochester Institute of Technology, ANDI BARBOUR, Argonne National Lab - Material Science Division, VLADIMIR KOMANICKY, Safarik University - Department of Condensed Matter Physics, CHENHUI ZHU, HOYDOO YOU, Argonne National Lab - Material Science Division — The interaction of carbon monoxide and oxygen on Au (001) single crystal facets has been investigated using synchrotron based surface x-ray diffraction and scattering techniques. Preliminary experiments confirm the quasi-hexagonal surface reconstruction can be influenced by exposure to CO and O, and indicate that oxidation may be present. Subsequent surface x-ray scattering experiments included a residual gas analyzer (RGA) with isotopic CO to tag the chemical species. Both CO (by itself) and O (dissociated from molecular O_2 by the x-rays) are capable of lifting the hexagonal surface reconstruction resulting in a disordered bulk truncated surface. A wide range of pressures (1 mTorr - 10 Torr) and temperatures (300 K - 900 K) have been explored. We have also adapted a system of coupled partial differential equations to model the absorption kinetics and surface reconstructions.

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