CO-INDUCED LIFTING OF Au(001) SURFACE RECONSTRUCTION

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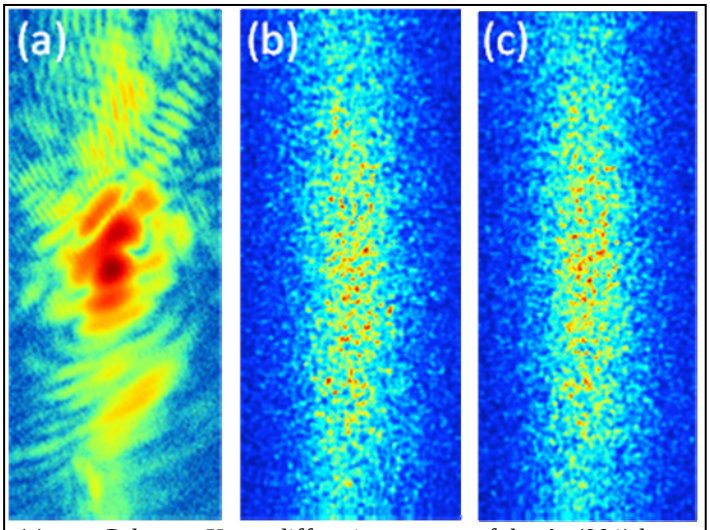
RESULTS

We report CO-induced lifting of the hexagonal surface reconstruction on Au(001). Using in situ surface X-ray scattering, we determined a pressure-temperature phase diagram for the reconstruction and measured the dynamical evolution of the surface structure in real time. Our observations provide evidence that, under certain conditions, even macroscopic Au surfaces, much larger than catalytic Au nanoparticles, can exhibit some of the reactive properties and surface transitions observed in systems known to be catalytically active such as Pt(001). A preliminary study using coherent surface x-ray scattering will also be presented where additional properties of the surface reconstruction have been directly observed for the first time.



(a) Coherent X-ray diffraction pattern of the Au(001) hex-reconstruction peak (1.2 1.2 0.2) at 25°C. (b) and (c) Time evolution of anti-bragg speckles at 840 °C; two frames are separated by several minutes.