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Electronic structure of catalytically active gold clusters supported on cerium oxide NEIL LAWRENCE, YUNYUN ZHOU, JOSEPH BREWER, VIVIANNA LAWRENCE, CHIN LI CHEUNG, YI GAO, XIAO CHENG ZENG, Department of Chemistry, University of Nebraska-Lincoln, Lincoln, NE 68588, LU WANG, WAI-NING MEI, RENAT SABIRIANOV, Department of Physics, University of Nebraska at Omaha, Omaha, NE 68182, LINGMEI KONG, JING LIU, PETER DOWBEN, Department of Physics and Astronomy, University of Nebraska-Lincoln, Lincoln, NE 68588, TAI-SING WU, YUN-LIANG SOO, National Synchrotron Radiation Research Center, National Tsing Hua University, Taiwan — The high catalytic activity of gold nanoclusters when compared to that of the bulk counterpart has been an intensively-studied phenomenon using both chemical and computational experiments in the last two decades. Due to the complexity of these systems and their size- and substrate-dependent activities, different explanations discussed in the literature for these unusual activities are still under debate. Since all these proposed reasons can lead to changes in the electronic structures of the resulting gold clusters, it is necessary to resolve the details of these potential changes in catalytically active systems. Here we report our findings on some features in the electronic structures of catalytically active gold clusters supported on cerium oxide investigated by resonance photoemission spectroscopy. Particularly, the d-band of the examined gold clusters was found to be incompletely filled. These results corroborate the computed electronic structures of our computed planar and non-planar gold cluster models on cerium oxide support.

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