Abstract Submitted
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CO adsorption on a transition metal quantum well system: fcc Co/Cu(100).[1] LEVAN TSKIPURI, HUA YAO, ROBERT BARTYNSKI, Rutgers University — We have examined the unoccupied electronic structure and CO bonding strength on the n-ML fccCo/Cu(100) metallic quantum well (MQW) system using inverse photoemission (IPE) and temperature programmed desorption (TPD), respectively. As-grown Co films exhibit well-defined MQW states that disperse upward with increasing film thickness, but they do not cross the Fermi level and are less pronounce than on other similar systems owing to partial overlap of exchange spit states. Upon CO adsorption a well-defined structure centered about 3.8 eV above the Fermi level appears and is assigned to the unoccupied CO $2\pi^*$ orbital. CO adsorbs molecularly at room temperature and in TPD measurements we find a desorption temperature of $\sim$ 375 K, which is about 30 K lower than what is observed for CO adsorbed on the hcp Co surfaces. When Co films are dosed at low temperatures ($\sim$ 120K), we find a second CO desorption peak around 230 K, once again similar to what is seen for hcp Co, but at a markedly lower temperature. We have observed similar desorption peak temperature shifts for CO desorption from the Ni/Cu(100) system. The CO desorption temperature varies with Co layer thickness and the possible role of quantum size effects on the molecule-surface bond will be discussed. [1]ACS-PRF Grant Number 40236-AC-5S

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