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The adsorption and desorption properties of CO on Mo(110) surface

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The adsorption of CO on Mo(110) surface was studied by TDS, synchrotron radiation. In the TDS for the adsorption of CO at 100 K on Mo(110) surface, two CO desorption states were observed at about 400 K and 1000 K, called α and β , respectively. The desorption kinetic order of CO in the β state is followed by the first order. According to the valence band spectra, two CO peaks at near 10.7 eV(4σ) and 7.0 eV($5\sigma+1\pi$) were observed, indicating molecular CO adsorption on Mo surface at 120 K. Even heating the adsorbed surface to 1070 K, we could also detect the CO 4σ peak that can be an important factor for identifying a contribution of the CO 4σ molecular orbital to the CO-metal bond. In addition, we have shown the C K-shell NEXAFS spectra, the π^* resonance(287 eV), σ^* resonance(304 eV) were observed for CO on Mo(110) at the higher temperature than 700 K.