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Hard X-ray photoelectron spectroscopy of the charge-density wave system $Ce_3Co_4Sn_{13}$ A SINGH, Y Y CHIN, H Y HAUNG, Y F LIAO, K D TSUEI, H J LIN, National Synchrotron Radiation Research Center, Hsinchu 30076, Taiwan, C N KUO, H F LIU, C S LUE, Department of Physics, National Cheng Kung University, Tainan 70101, Taiwan, C T CHEN, D J HUANG, A CHAINANI, National Synchrotron Radiation Research Center, Hsinchu 30076, Taiwan — We study the electronic structure of the charge density wave (CDW ; T_{CDW} ~155 K) system $Ce_3Co_4Sn_{13}$[1,2] using bulk-sensitive Hard X-ray photoelectron spectroscopy (HAXPES ; hν ~6.480 keV). We measure the core-levels and valence band spectra of $Ce_3Co_4Sn_{13}$ above and below the CDW transition, at T = 170 K and T = 20 K, respectively. While the Ce 3d core-levels show negligible changes, the Co 2p and Sn 3p core-levels show a small but finite increase in the peak-widths and binding energies in the CDW phase. The behavior of the Ce 3d and Co 2p core levels are consistent with a recent x-ray fluorescence study at the Ce L_3-edge and Co K-edge[2]. Based on known atomic cross-sections, the HAXPES valence band spectra are not sensitive to Ce 4f partial density of states but show a feature at about 1.5 eV binding energy, which is attributed to Co 3d partial density of states. The valence band spectra show a clear Fermi edge even in the CDW phase, consistent with the metallic behavior observed by electrical resistivity[1]. The results indicate very weak charge-disproportionation in $Ce_3Co_4Sn_{13}$ across the CDW transition. References : [1] C. S. Lue et al. Phys. Rev. B 85, 205120 (2012). [2] Y. Otomo et al. Phys . Rev. B 94, 075109 (2016).

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