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Electronic Structures of the Charge Density Wave System RTe_2 (R=Ce, Pr) investigated by ARPES JEONGSOO KANG, EUNSOOK LEE, D.H. KIM, The Catholic University of Korea, JONATHAN DENLINGER, Lawrence Berkeley National Laboratory, B.H. MIN, Y.S. KWON, DGIST, JUNWON KIM, KYOO KIM, B.I. MIN, Pohang University of Science and Technology — The rare-earth (R)-based RTe_2 compounds are known as the charge-density-wave (CDW) systems. In this work, we have investigated the electronic structures of RTe_2 (R=Ce, Pr) by employing angle-resolved photoemission spectroscopy (ARPES) experiment and the first-principles band structure calculations. The overall shapes and sizes of the measured Fermi surfaces (FSs) of RTe_2 are found to be similar to those of the calculated FSs for the undistorted structures. The metallic states crossing the Fermi level (E_F) are observed in ARPES even in the CDW state, indicating that the metallic states remain under the CDW transition with the remnant ungapped FSs. R $4f$ PES spectra exhibit that the $4f$ hybridization peak ($4f^n c^{m-1}$) in R=Pr is located deeper than in R=Ce, resulting in the much weaker $4f$ spectral intensity near E_F in R=Pr. The shadow bands and the corresponding very weak FSs are found to arise from the band folding due to the interaction of Te(1) layers with R-Te(2) layers and the CDW-induced FS reconstruction. The E_F-crossing states are stronger with the linear vertical polarization than with the linear horizontal polarization. The photon-energy maps in ARPES demonstrate the two-dimensional character of the near- E_F states.

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