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Revealing Quasi-Two-Dimensional Metallicity in a Layered Chalcogenide Ti_2PTe_2 JI SEOP OH, IBS-CCES, Seoul Natl. Univ., HO-SUNG YU, Sungkyunkwan Univ., IBS-CINAP, CHANG-JONG KANG, POSTECH, SOOBIN SINN, IBS-CCES, Seoul Natl. Univ., MOONSUP HAN, YOUNG JUN CHANG, Univ. of Seoul, BYEONG-GYU PARK, Pohang Accelerator Laboratory, KIMOON LEE, Kunsan Natl. Univ., BYUNG IL MIN, POSTECH, SUNG WNG KIM, Sungkyunkwan Univ., HYEONG-DO KIM, TAE WON NOH, IBS-CCES, Seoul Natl. Univ. — Transition metal chalcogenides (TMCs) have been attracting broad interest among physicists and material scientists because of their physical properties leading to high potential for applications. Most studies have been focused on semiconducting binary TMCs, but studies on metallic or ternary TMCs are relatively rare. Recently, ternary TMCs is expected to enlarge the scope of research on TMCs because they show distinguishable properties from binary semiconducting TMCs. Here, we studied how quasi-two-dimensional (2D) metallicity evolves in a ternary layered chalcogenide Ti_2PTe_2 (TPT). Temperature-dependent resistivity shows a metallic character with two types of carriers in quasi-2D nature. To investigate the origin of the metallicity, we experimentally and theoretically studied the electronic structure of TPT. Fermi surfaces of TPT in the first Brillouin zone have quasi-2D electron pockets and a small three-dimensional hole pocket, which agrees with the transport results. We also present theoretical calculations to compare with the experimental results. The calculations are well matched with the experimental results, and it suggests that quasi-2D metallicity originates from Ti $3d$ orbitals.

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