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Electronic structure of $Ba(Zn_{0.875}Mn_{0.125})_2As_2$ studied by angle-resolved photoemission spectroscopy DONG QIAN, FENGFENG ZHU, WEIDONG LUO, JINFENG JIA, Shanghai Jiao Tong University — Electronic structure of single crystalline $Ba(Zn_{0.875}Mn_{0.125})_2As_2$, parent compound of the recently founded high-temperature ferromagnetic semiconductor, was studied by high-resolution photoemission spectroscopy (ARPES). Through systematically photon energy and polarization dependent measurements, the energy bands along the out-of-plane and in-plane directions were experimentally determined. Except the localized states of Mn, the measured band dispersions agree very well with the first-principle calculations of undoped $BaZn_2As_2$. A new feature related to Mn 3d states was identified at the binding energies of about -1.6 eV besides the previously observed feature at about -3.3 eV. We suggest that the hybridization between Mn and As orbitals strongly enhanced the density of states around -1.6 eV. Although our resolution is much better compared with previous soft X-ray photoemission experiments, no clear hybridization gap between Mn 3d states and the valence bands proposed by previous model calculations was detected.

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