Electronic structure transition: the driving force behind magnetic and lattice structure transitions in NaFeAs

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One of the mysteries in iron-based high-temperature superconductors is that a spin density wave (SDW) transition is always accompanied by a structure transition. So far there is no hard experimental evidence to establish a general relationship between those two transitions. Here we report a strong evidence to unveil this mystery. The electronic structure of NaFeAs is systematically studied with high resolution angle-resolved photoemission spectroscopy on high quality single crystal. An electronic structure transition with large portions of electronic band shift is found to take place around the lattice structure transition temperature, and the shift smoothly increases as the temperature lowers through the SDW transition. Band folding due to magnetic order emerges around structural transition. Our results manifest that the electronic structure transition rather than the Fermi surface nesting provides the driving force of both the lattice structural and magnetic transitions.