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Interplay of superconductivity and rattling phenomena in β -pyrochlore KOs_2O_6 studied by photoemission spectroscopy TAKAHIRO SHIMOJIMA, YUKI SHIBATA, KYOKO ISHIZAKA, TAKAYUKI KISS, ASHISHI CHAINANI, TAKAYOSHI YOKOYA, TADASHI TOGASHI, XIAOYANG WANG, CHUANG-TIAN CHEN, SHUNTARO WATANABE, JYUNICHI YAMAURA, SHIGEKI YONEZAWA, YUJI MURAOKA, ZENJI HIROI, TOMOHIKO SAITOH, SHIK SHIN, UNIVERSITY OF TOKYO TEAM, THE INSTITUTE OF PHYSICAL AND CHEMICAL RESEARCH TEAM, OKAYAMA UNIVERSITY TEAM, TOKYO UNIVERSITY OF SCIENCE TEAM, CHINESE ACADEMY OF SCIENCE TEAM — The electronic structure near Fermi level of KOs_2O_6 is studied by a laser-excited photoemission spectroscopy. The superconducting(SC) gap clearly opens across the SC transition at 9.6 K, with the strong electron-phonon coupling value of $2\Delta(0)/k_B T_c \geq 4.56$. Fitting analysis identifies clear anomalies at 7.5 K in the temperature dependences of the SC gap size and the quasiparticle relaxation lifetime. These anomalies and the fine spectral structures arising from phonons, suggest that the existence of the rattling behavior of K ions significantly affects the superconductivity in KOs_2O_6 .

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