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Temperature-dependent electronic structure evolution of spin-orbit coupling induced Mott insulator Sr_2IrO_4 S. J. MOON, W. S. CHOI, T. W. NOH, ReCOE and FPRD, Department of Physics and Astronomy, Seoul National University, Seoul 151-747, Korea, H. JIN, CSCMR, Department of Physics and Astronomy, Seoul National University, Seoul 151-747, Korea, Y. S. LEE, Department of Physics, Soongsil University, Seoul 156-743, Korea, G. CAO, Department of Physics and Astronomy, University of Kentucky, Lexington, Kentucky 40506, USA — Recently, the effect of spin-orbit coupling in $5d$ transition metal oxides attracted lots of attention. It was found that the cooperative interaction of spin-orbit coupling and electron correlation could realize unique Mott insulating ground state of Sr_2IrO_4. We investigated temperature-dependent optical conductivity spectra of $5d$ Mott insulator Sr_2IrO_4. We observed drastic changes of the optical conductivity spectra. As temperature increases, the Mott gap was significantly reduced and spectral weight redistribution between the Ir t_{2g} bands occurred. The electronic structure changes accompanied the change of optical phonon modes. These experimental observations could be understood in terms of the effects of spin-orbit and electron-lattice coupling.

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