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Determination of $t_{2g}$ Complex in Na$_x$CoO$_2$ by Angle-Resolved Photoemission Spectroscopy HONGBO YANG, Brookhaven National Laboratory, JIHUA MA, ZHIHUI PAN, Boston College, ALEXEI FEDOROV, Lawrence Berkeley National Laboratory, JONGYIN JIN, BRIAN SALES, DAVID MANDRUS, Oak Ridge National Laboratory, ZIQIANG WANG, HONG DING, Boston College — A systematic investigation on $t_{2g}$ complex in Na$_x$CoO$_2$ is carried by ARPES. By taking advantage of the matrix element effect, we recover and trace the dispersion of all three $t_{2g}$ bands for different Na concentration ($x = 0.3 \sim 0.7$). The dispersion “kink” we observed before is found to be cause by the hybridization between $a_{1g}$ and $e'_g$ bands. This band hybridization forms a narrow band near the Fermi level, which causes a large mass renormalization. The width of the non-hybridized bands is about half of the one predicted by LDA calculations, which is possibly due to the correlation effect.

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