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Two-orbital analysis on the material dependence of T_c in the single-layered cuprates HIROFUMI SAKAKIBARA, HIDETOMO USUI, KAZUHIKO KUROKI, The University of Electro-Communication, RYOTARO ARITA, HIDEO AOKI, The University of Tokyo — The significant material dependence of T_c in the cuprates remains an important puzzle, even within the single-layer family. A recent paper[1] has demonstrated, with a two-orbital model, that, while the usual wisdom is to considered the cuprate as a one-band ($d_{x^2-y^2}$) system, a hybridization with the second (d_{z^2}) one around the Fermi energy significantly affects T_c in the spin-fluctuation mediated pairing. There, the energy offset (ΔE) between the two orbitals has been shown to govern the extent of the d_{z^2} mixture, hence T_c. Here we further extend this line of approach to identify the key factors that determine ΔE in the cuprates, focusing on the structural difference among broader (La, Hg, Bi, and Tl) single-layer cuprates. We have revealed that the apical oxygen height ($h_{\rm O}$) above the CuO_2 plane and the separation (d) between the CuO_2 planes are the important parameters that determine ΔE, thereby causing the material dependence of T_c. This picture enables us to capture the T_c variation among the single-layered cuprates in a simple lattice-parameter space. [1]H. Sakakibara *et al.* Phys. Rev. Lett. **105**, 057003 (2010)

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