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Huge enhancement of superconductivity in the collapsed tetragonal $\text{KFe}_2\text{As}_2$ JIANJUN YING, LING-YUN TANG, Center for High Pressure Science and Technology Advanced Research, HO-KWANG MAO, VIKTOR STRUZHKin, Geophysical Laboratory, Carnegie Institution of Washington, AI-FENG WANG, XIAN-HUI CHEN, University of Science and Technology of China, XIAO-JIA CHEN, Center for High Pressure Science and Technology Advanced Research — Recent work (F. F. Tafti, et al. Nature Phys.9, 349 (2013)) on hole-overdoped iron pnictide $\text{KFe}_2\text{As}_2$ indicated a paring symmetry change at pressure of around 1.7 GPa. The investigation for the low-pressure region (below 7 GPa) revealed oscillation of $T_c$ with pressure. Here we report results of high-pressure transport and XRD measurements on $\text{KFe}_2\text{As}_2$ single crystals at high pressures up to 30 GPa. We map out the phase diagram of $\text{KFe}_2\text{As}_2$ and find a huge enhancement of $T_c$ in the collapsed tetragonal phase. The correlation between $T_c$, electronic and crystal structures is discussed. The strong electronic correlations are proposed to account for such an unexpected $T_c$ enhancement in $\text{KFe}_2\text{As}_2$.