Competing-fluctuation-induced anomalous magnetocaloric effects in perovskite manganites HIDEAKI SAKAI, YASUJIRO TAGUCHI, YOSHINORI TOKURA\textsuperscript{1}, Cross-Correlated Materials Research Group, RIKEN — A magnetocaloric (MC) effect refers to the isothermal entropy change induced by applying (or removing) a magnetic field to the materials, which is a performance index of the magnetic refrigeration technology. In this study, the variation of MC effects has been systematically investigated for colossal magnetoresistive manganites $R_{0.6}\text{Sr}_{0.4}\text{MnO}_3$ ($R=$La-Gd) by controlling the $R$-dependent one-electron bandwidth. With decreasing the bandwidth, the temperature profile of entropy change exhibits a larger peak at the ferromagnetic transition temperature and a steeper drop below it, due to the first-order nature of the transition promoted by a competing charge-orbital ordering instability. For the smallest-bandwidth systems adjacent to the metal-insulator phase boundary, a rectangular-shaped profile for the entropy change emerges with an anomalously wide temperature range. Model calculations have indicated that the bicritical fluctuation enhanced in the phase-competing region has a strong impact on such MC features \cite{1}.


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