The enhanced magnetoresistant effects and cluster-glass state induced by A-site cational size disorder KEFENG WANG, LIFENG WANG, Nanjing National Laboratory of Microstructures, Nanjing University, JUNMING LIU, Nanjing National Laboratory of Microstructures, Nanjing University & International Center for Materials Physics, Chinese Academy of Sciences — In pervoskite-structure oxides, not only the A-site cational mean radii, but also the variance of the A-site cational radii, controls the physical properties of the sample. The disorder effects induced by A-site cational size mismatch in large band-width manganite La$_{0.55}$Sr$_{0.45}$MnO$_3$ have been carefully studied by preparing a series of samples which have the same $< r_A >$=1.25Å with different variance of the A-site ionic radii. The ground state of the system changed from a ferromagnetic metal to a cluster-glass insulator with increasing of the variance of the A-site ionic radii. Moreover, the magnetoresistant effects is enhanced significantly in the sample with intermediate disorder. We argued that the A-site disorder enhanced the fluctuation between the competing ordered states and then induced the cluster-glass state and the enhanced magnetoresistant effects.

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