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Abstract: A systematic investigation on the structure, magnetism, magnetocaloric effect, and critical behaviors of multiferroic Lu_2NiMnO_6 synthesized by sol-gel method are reported. This compound crystallizes in a monoclinic structure with the space group $P2_1/n$. Upon decreasing temperature, a single magnetic transition from paramagnetic to ferromagnetic phase has been observed, around which considerable magnetic entropy changes can be obtained. Besides, evaluation of the critical exponents are performed using various techniques, like the modified Arrott plot, Kouvel-Fisher method and critical isotherm analysis based on the magnetic data around magnetic transition temperature. The obtained critical exponent values are found to be coincided and comparable with those predicted by the mean-field model,