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**Magnetic entropy change associated with critical behavior in the precursor region of single crystalline FeGe**[1] LISHA XU, Nanjing University of Aeronautics and Astronautics, HUI HAN, Chinese Academy of Sciences, JIYU FAN, Nanjing University of Aeronautics and Astronautics, LEI ZHANG, HAIFENG DU, Chinese Academy of Sciences, HAO YANG, Nanjing University of Aeronautics and Astronautics, HIGH MAGNETIC FIELD LABORATORY, CHINESE ACADEMY OF SCIENCES COLLABORATION, DEPARTMENT OF APPLIED PHYSICS, NANJING UNIVERSITY OF AERONAUTICS AND ASTRONAUTICS COLLABORATION — Cubic helimagnet FeGe has emerged as a class of skyrmion materials near room temperature that may impact future information technology. Experimentally identifying the detailed properties of skyrmion materials enables their practical application acceleratedly. Here we study the magnetic entropy change (MEC) of single crystalline FeGe in its precursor region and clarify its close relation to the critical exponents of a second-order phase transition in this area. The maximum MEC is found to be 2.86 J/kg.K for 7.0 T magnetic field change smaller than that of common magnetocaloric materials indicating the multiplicity and complexity of the magnetic structure phases in the precursor region. This result also implies that the competition among the multimagnetic phases can partly counteract the magnetic field driven force and establishes a stable balance. Based on the obtained MEC and the critical exponents, the exact Curie temperature of single crystalline FeGe under zero magnetic field is confirmed to be 279.1 K, higher than previously reported 278.2 K. This finding pave the way for reconstruction of FeGe phase diagram in the precursor region.

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