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Spontaneous transition in TiNiFe strain glass system JIAN ZHANG, XIAOBING REN, YU WANG, KAZUHIRO OTSUKA, JUN SUN, Multi-disciplinary Materials Research Center, Xi an Jiaotong University,710049, P.R. China; Ferroic physics group, NIMS, Tsukuba, Japan — Glass has been considered as one major challenge for the statistic mechanics, for the presumption of ergodicity is no longer valid. Hence, glass transition was normally viewed as solely kinetic driven process, including ferroic cluster glasses. Whereas, the ferroic cluster glasses appear once the thermodynamics driven ferroic phase transitions are suppressed by the point defects. It seems quite intriguing why the power of thermodynamics is immediately eliminated when the system reaches the threshold composition, and taken over completely by kinetics. We demonstrate the power of the thermodynamics on the glass state by presenting for the first time the existence of spontaneous transition from strain glass to long range phase in the newly found strain glass in TiNiFe, evidenced with various experimental methods. In addition, we provide one phenomenological model to reveal the underlying mechanism due to the competition between the thermodynamic and kinetic factors. Our results on this relatively simply glass system may bring new ideas in other fields of science and technology, i.e. biophyscis and biochemistry.

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