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Large exchange bias after zero-field cooling from an unmagnetized state¹ LAN WANG, Nanyang Technological University, BAOMIN WANG, Nanyang Technological University, YONG LIU, Nanyang Technological University, PENG REN, Nanyang Technological University, BIN XIA, Nanyang Technological University, KAIBIN RUAN, Nanyang Technological University, JIABAO YI, National University of Singapore, JUN DING, National University of Singapore, XI-AOGUANG LI, University of Science and Technology of China — Exchange bias (EB) is usually observed in systems with interface between different magnetic phases after *field cooling*. Here, we report an unexpected finding that a *large* EB can be realized in Ni-Mn-In bulk alloys after *zero-field cooling from an unmagnetized state*. We propose that the size of superparamagnetic domains in the alloys can grow up under external magnetic fields, which induces a transition from a superspin glass to a superferromagnetic (SFM) state. The SFM unidirectional anisotropy, which is the origin of EB effect, can be created at the *newly* formed SFM-antiferromagnetic interface during the initial magnetizing process.

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