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Origin of "aging" in shape-memory alloys XIANGDONG DING, Los Alamos National Laboratory, JUNKAI DENG, Xi'an Jiaotong University,China, TURAB LOOKMAN, AVADH SAXENA, Los Alamos National Laboratory, XIAOBING REN, National Institute for materials science, Japan — For more than half a century it has been widely observed that a majority of shape-memory alloys exhibit a gradual change in physical properties with time in the martensitic phase, and this is referred to as "aging." However, its microscopic mechanism has remained controversial due to lack of experiments that can probe atomic level processes. We clarify the atomic mechanism for how shape memory alloys "age" in time using a combination of molecular dynamics and Monte-Carlo simulations. Through analysis of the atomic configurations during aging, we find that the observed phenomenon is associated with a gradual change in the short range order of point defects so that the defect short range order tends to adopt the same "symmetry" as the crystal symmetry of the host martensite lattice. The results provide atomic-level evidence for the symmetry-conforming short-range order model, and may provide new insight into how to control aging to design aging-free shape memory alloys. Reference: 1). J. Deng, X. Ding, T. Lookman, et al, Physical Review B , **81**, 220101(R), 2010 2). J. Deng, X. Ding, T. Lookman, et al, Physical Review B, **82**,184101, 2010 3). J. Deng, X. Ding, T. Lookman, et al, Applied Physics Letters, **97**,171902, 2010

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