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Suppression of superconductivity in Fe chalcogenides by annealing: A reverse effect to pressure PENG TONG, DESPINA LOUCA, Department of Physics, University of Virginia, ANNA LLOBET, Lujan Neutron Scattering Center, Los Alamos National Laboratory, JIAQIANG YAN, Department of Materials Science and Engineering, University of Tennessee, RYOTARO ARITA, Department of Applied Physics, University of Tokyo, and JST TRIP — Superconductivity in $FeTe_{1-x}Se_x$ can be controlled by annealing, in the absence of extrinsic influences. Using neutron diffraction, we show that T_C sensitively depends on the atomic configurations of the Te and Se ions. Low temperature annealing not only homogenizes the Te and Se ion distribution as previously observed, it suppresses T_C because of changes in the chalcogen ions' z-parameter. In particular, the height of Te from the Fe basal plane is much reduced while that for Se shows a modest increase. These trends are reverse of the effects induced by pressure.

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