**Supplemental Information for article:**

# Stabilizing the amorphous Sb by adding alien seeds for durable memory materials

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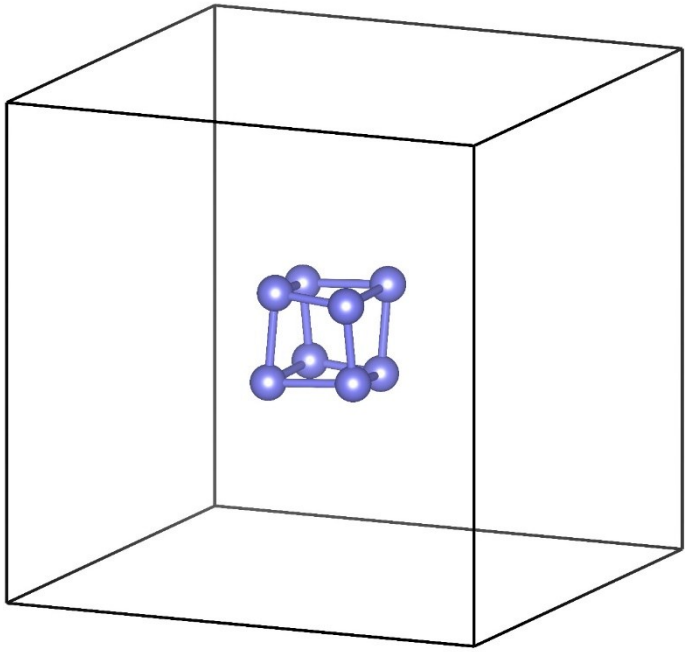

Figure S1. The crystal seed of 8 atoms is fixed to the center of the box.

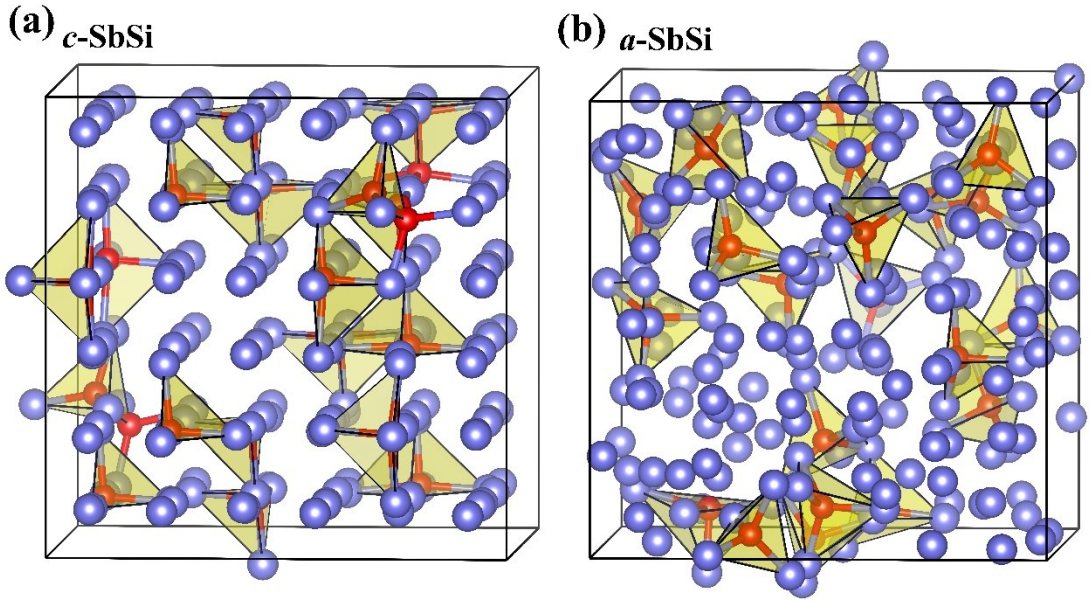


Figure S2. Amorphous and crystalline model of SbSi.

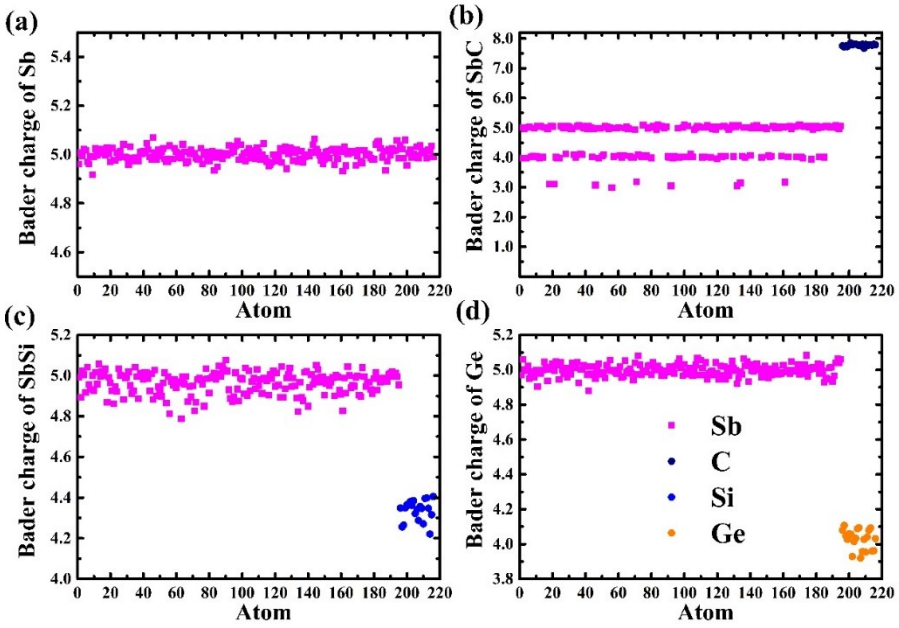


Figure S3. Bader charge of amorphous models. The Ge and Si atoms have the weaker ability to grasp the electrons than Sb, while the C atoms almost occupy all 8 electrons.

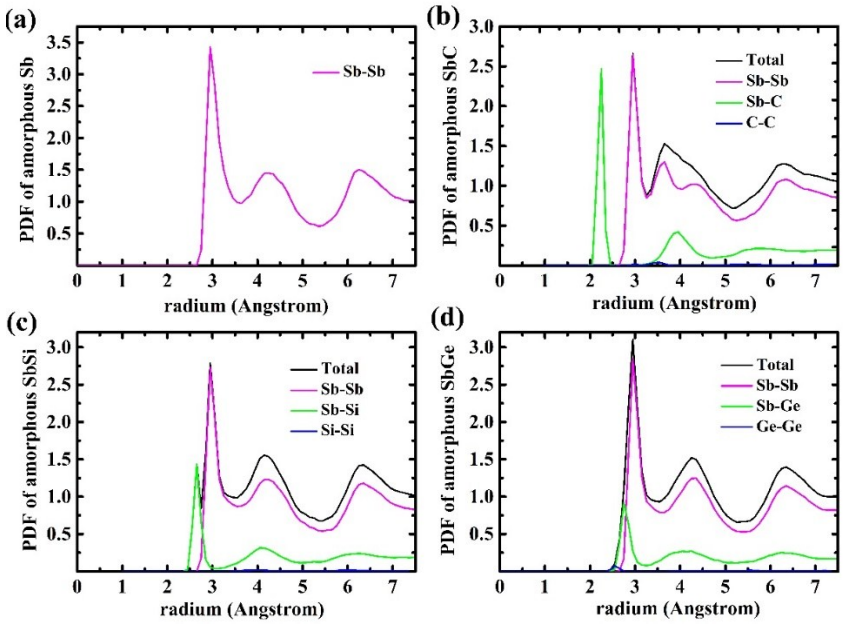


Figure S4. Pair distribution function of undoped and doped antimony in amorphous state. The doped atoms formed shorter bonds with Sb atoms than Sb-Sb.

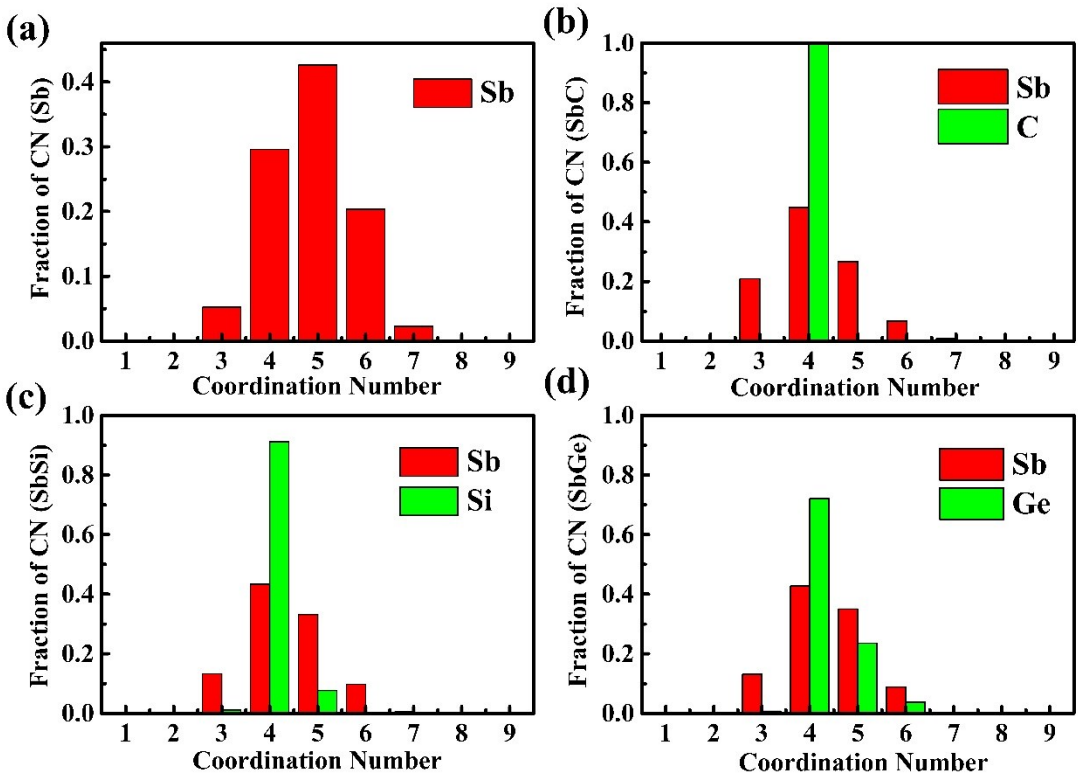


Figure S5. Coordination number of amorphous doped antimony. With doping C, Si and Ge, the distribution of atoms with 4 nearest-neighbors increased, according with the increasing tendency of tetrahedron.

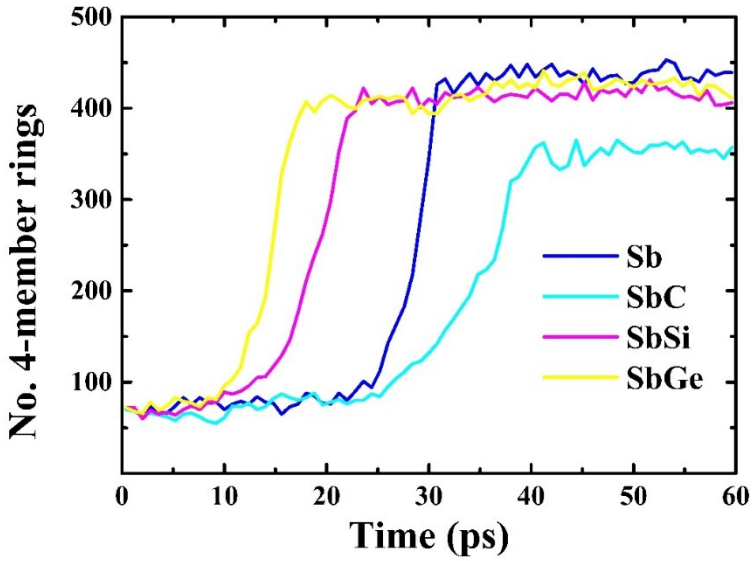


Figure S6. Crystallization trajectory of 2% C, Si, Ge doped. With various content of dopants, all the crystallization speed are reduced.

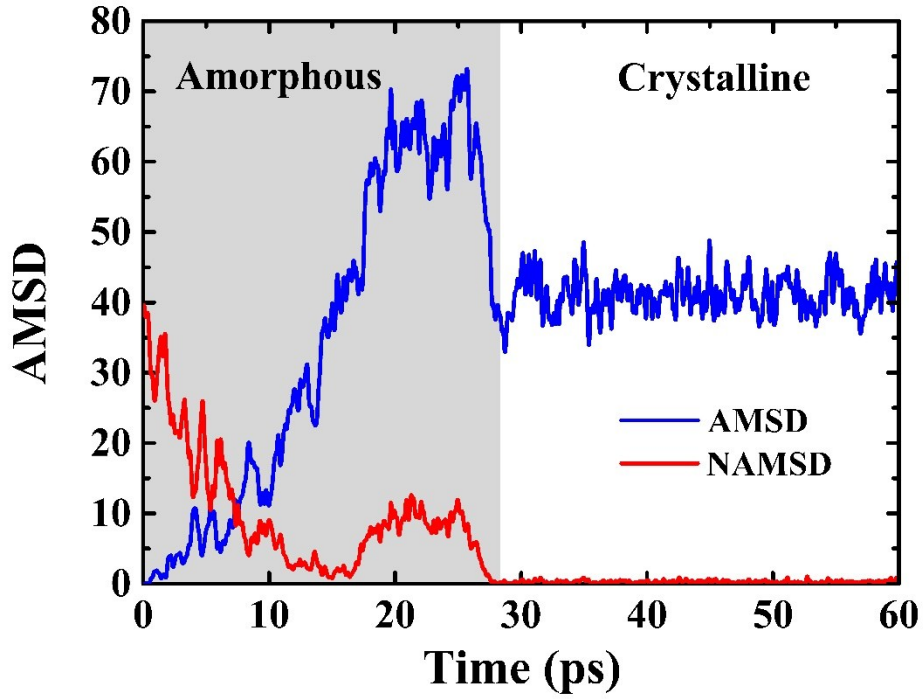


Figure S7. ASMD (Atomic mean square displacement) and NAMSD (Normalized MSD).

$$NAMSD = [x(t) - x(t_{max})]^2 + [y(t) - y(t_{max})]^2 + [z(t) - z(t_{max})]^2$$

The more accurate crystallized time point of atom could be given by NAMSD.

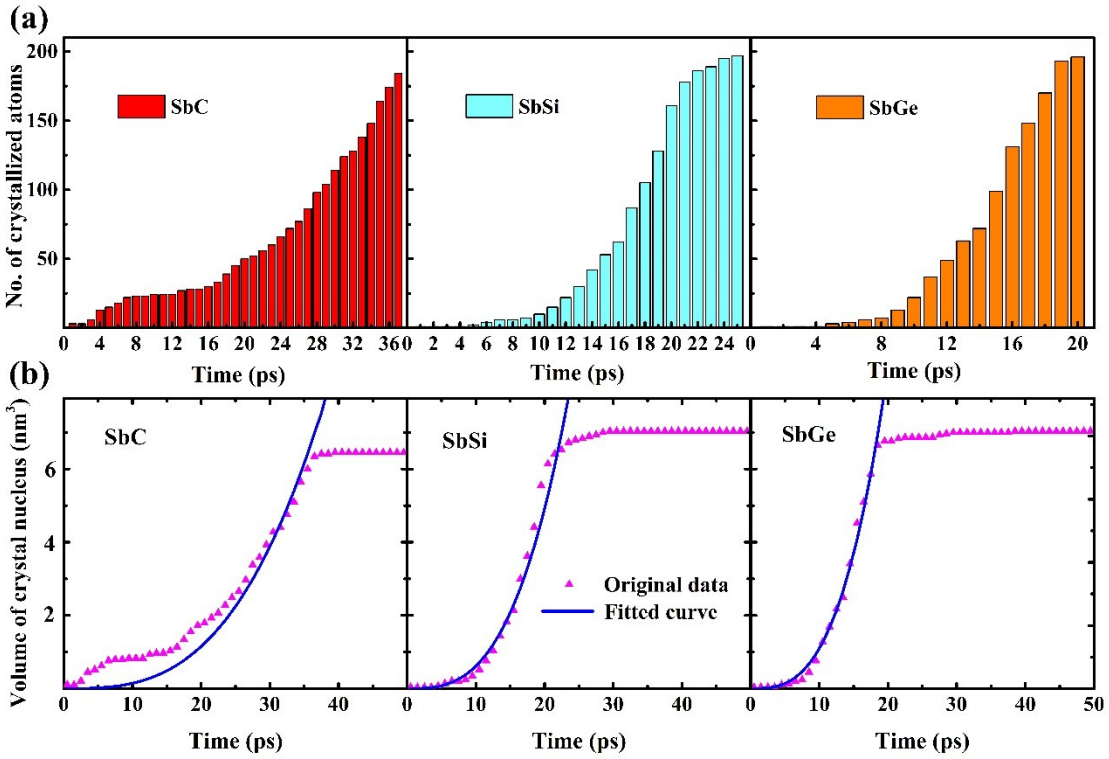


Figure S8. a) Crystallized atoms. b) Volumes of crystal nucleus and fitted curve.

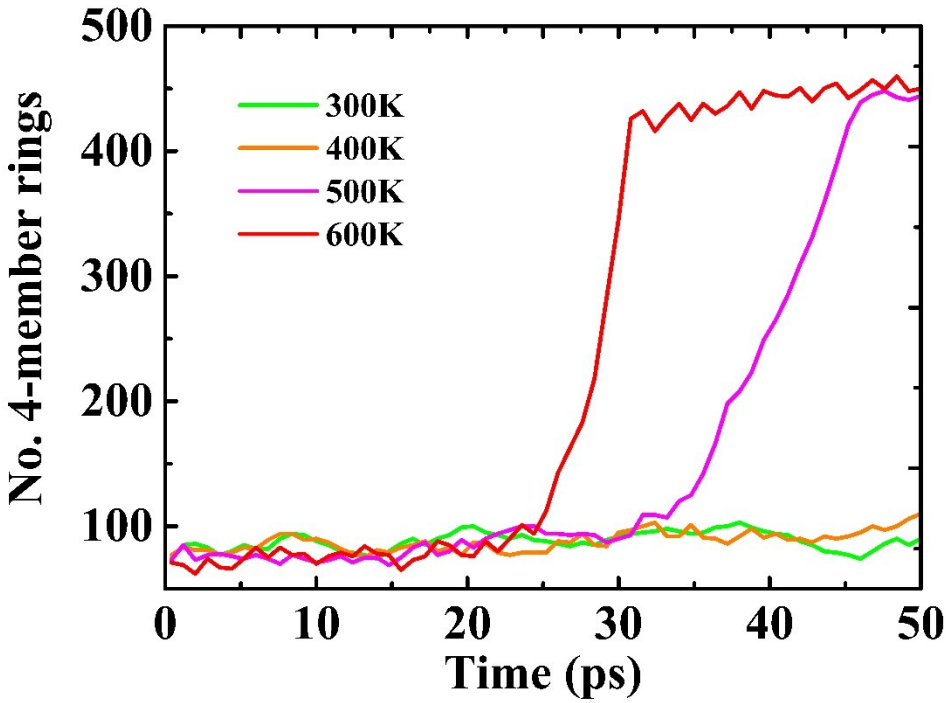


Figure S9. Crystallization trajectories of Sb at 300 K, 400 K, 500 K and 600 K.

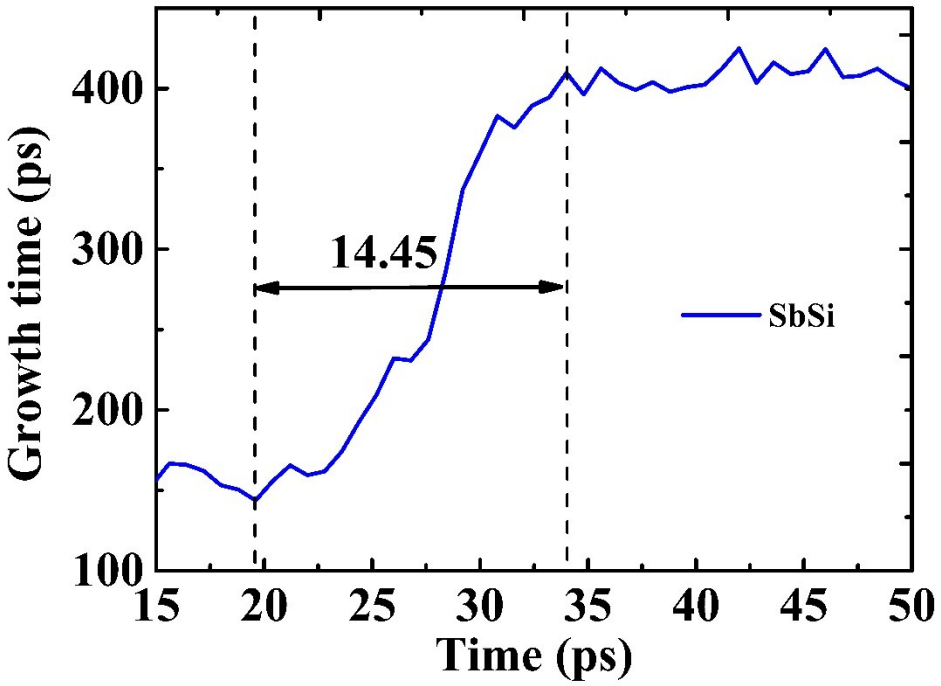


Fig S10. Crystallization time of SbSi.