Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supplementary Information

Intersecting nodal rings in orthorhombic-type $BaLi_2Sn$ compound

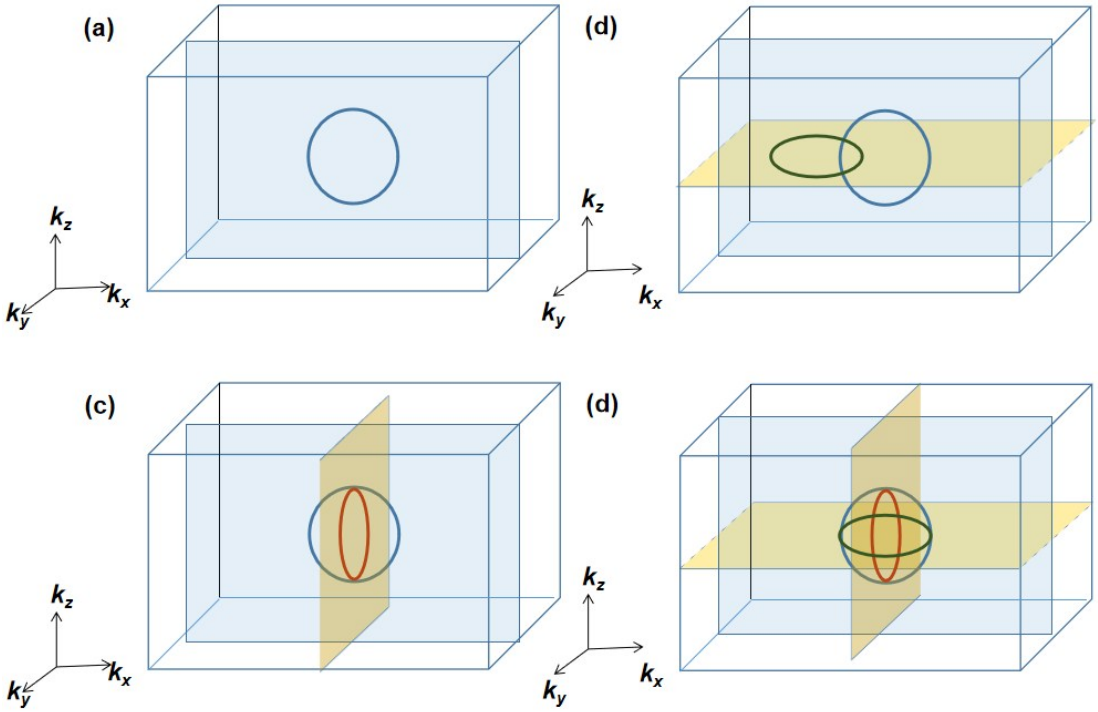

Fig. S1. Schematic diagrams of (a) isolated nodal ring; (b) nodal link; (c)-(d) INRs composed of two nodal rings and three nodal rings, respectively.

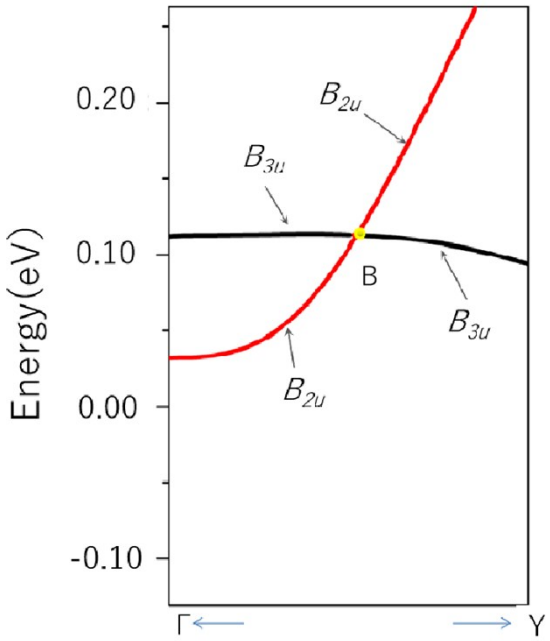

Fig. S2. Enlarged view of the band structure along the Γ-Z path.

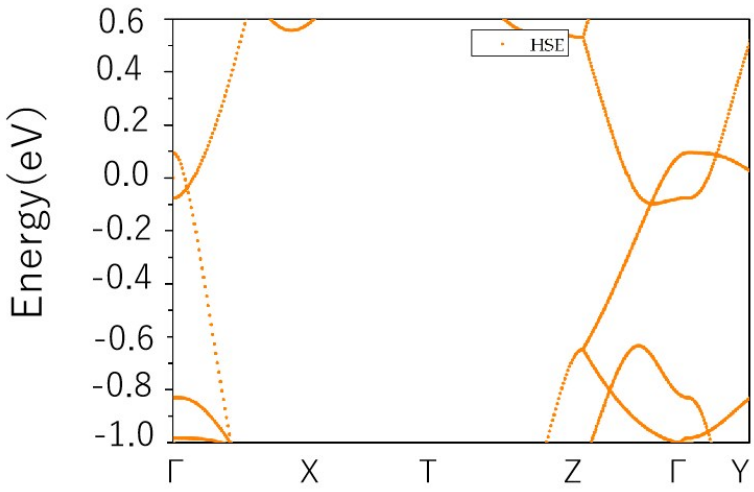

Fig. S3 Band structure of $BaLi_2Sn$ calculated with HSE06.

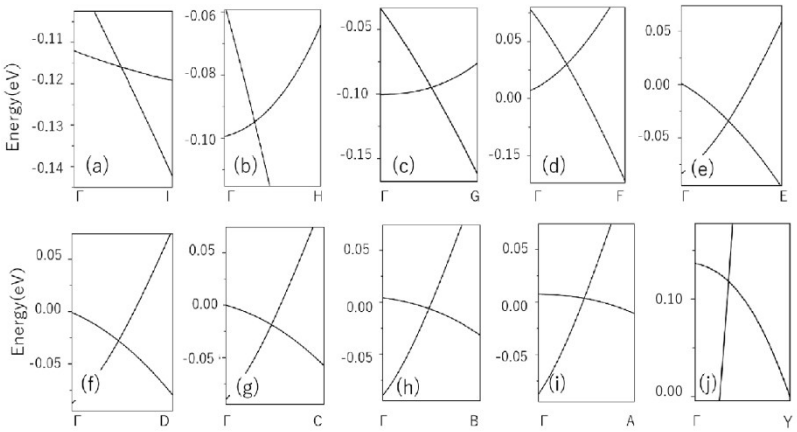

Fig. S4. The calculated band structures along Γ-M (M = A, B, C, D, E, F, G, H, I, and Y) in the $k_x = 0$ plane.

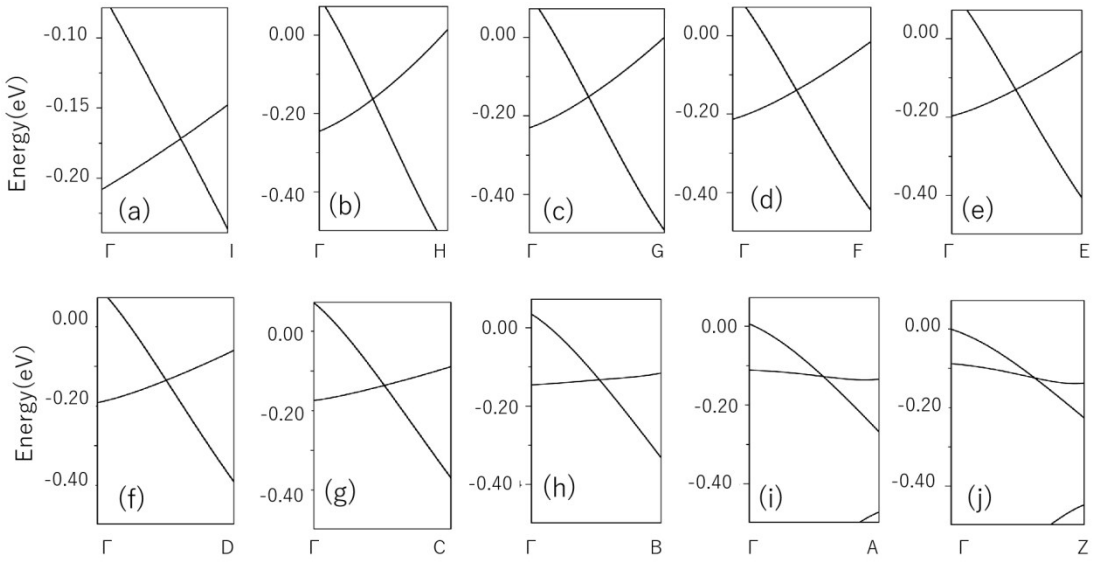

Fig. S5. The calculated band structures along Γ-N (N = X, A, B, C, D, E, F, G, H, I, and Z) in the $k_y = 0$ plane.

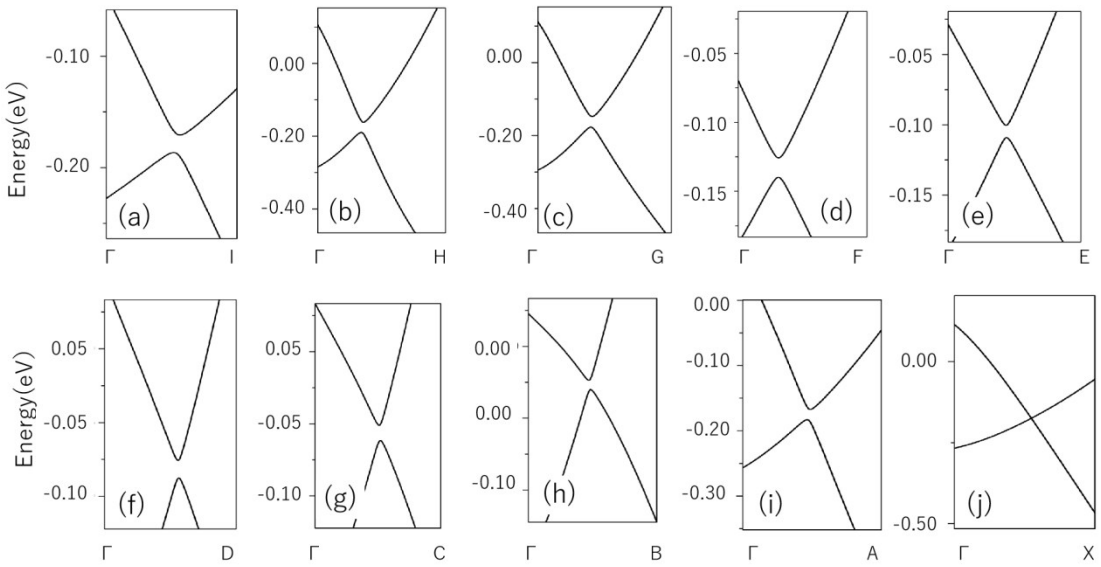

Fig. S6. The calculated band structures along Γ-Q (Q = A, B, C, D, E, F, G, H, I, and X) in the k_z = 0 plane.

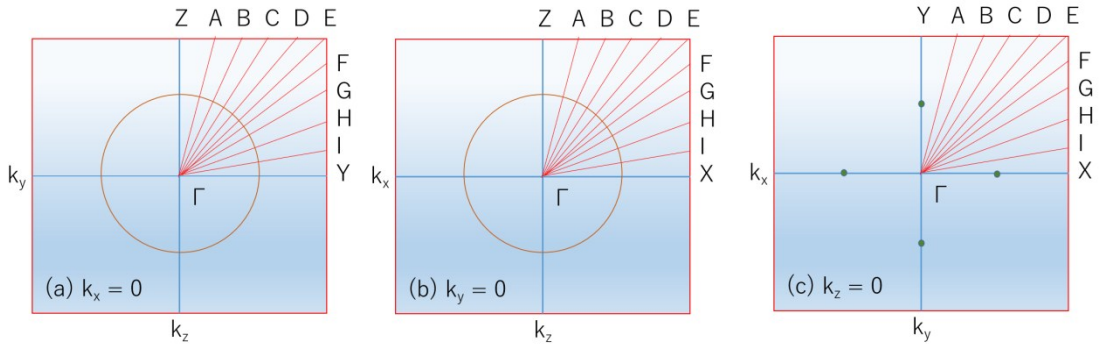

Fig. S7 (a)-(c). schematic diagrams of possible 1D TE in $k_x = 0$, $k_y = 0$, and $k_z = 0$ planes. The TNR, i.e., the 1D TE, can be observed only in the $k_x = 0$ and $k_y = 0$ planes.

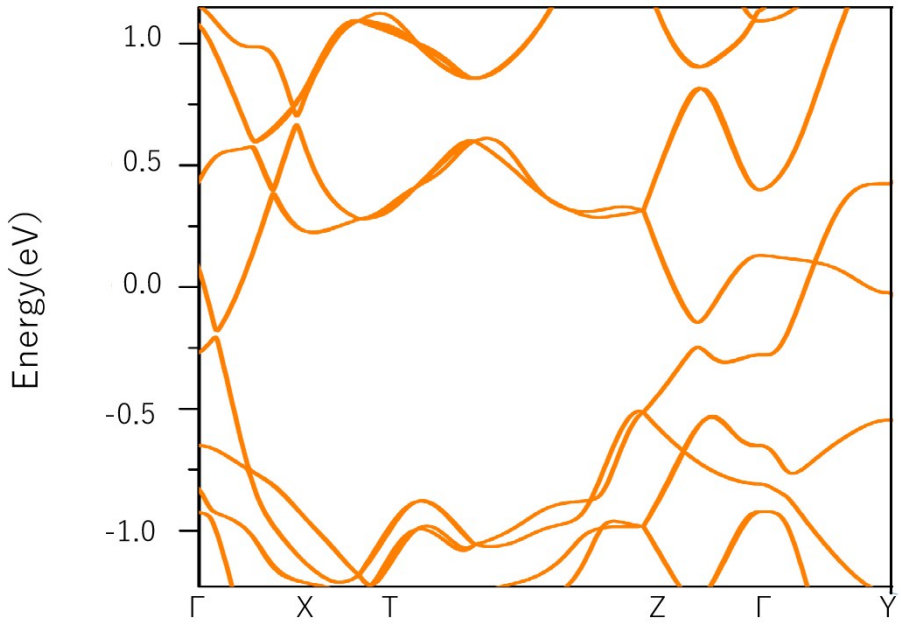

Fig. S8. The calculated band structures of the $BaLi_2Sn$, calculated with the help of the first-principles tight-binding model within Wannier90 code.

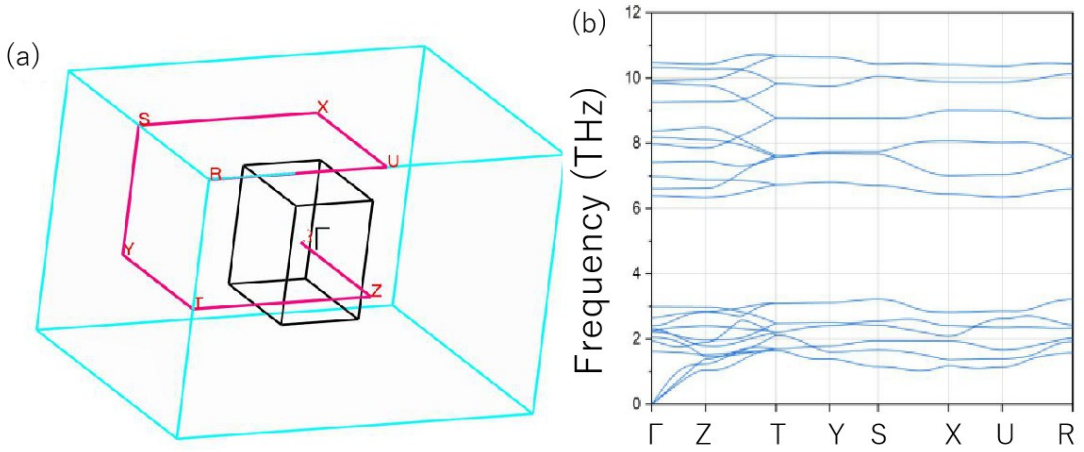

Fig. S9. Calculated phonon spectrum (b) along the selected Γ-Z-T-Y-S-X-U-R (a) directions. The phonon dispersion was checked with the CASTEP modulus in MATERIALS STUDIO based on the finite displacement method. A plane-wave cutoff of 400 eV was used for the calculations.

Table S1: The calculated elastic constants (C_{ij}) for $BaLi_2Sn$ compound.

Compound	C_{11} [GPa]	C_{12} [GPa]	C_{13} [GPa]	C_{22} [GPa]	C_{23} [GPa]	C_{33} [GPa]	C_{44} [GPa]	C_{55} [GPa]	C_{66} [GPa]
$BaLi_2Sn$	57.52	12.15	6.78	45.84	22.78	29.50	21.56	16.72	12.11