Supporting Information

Law and Disorder: Special Stacking Units – Building the Intergrowth $Ce_6Co_5Ge_{16}$

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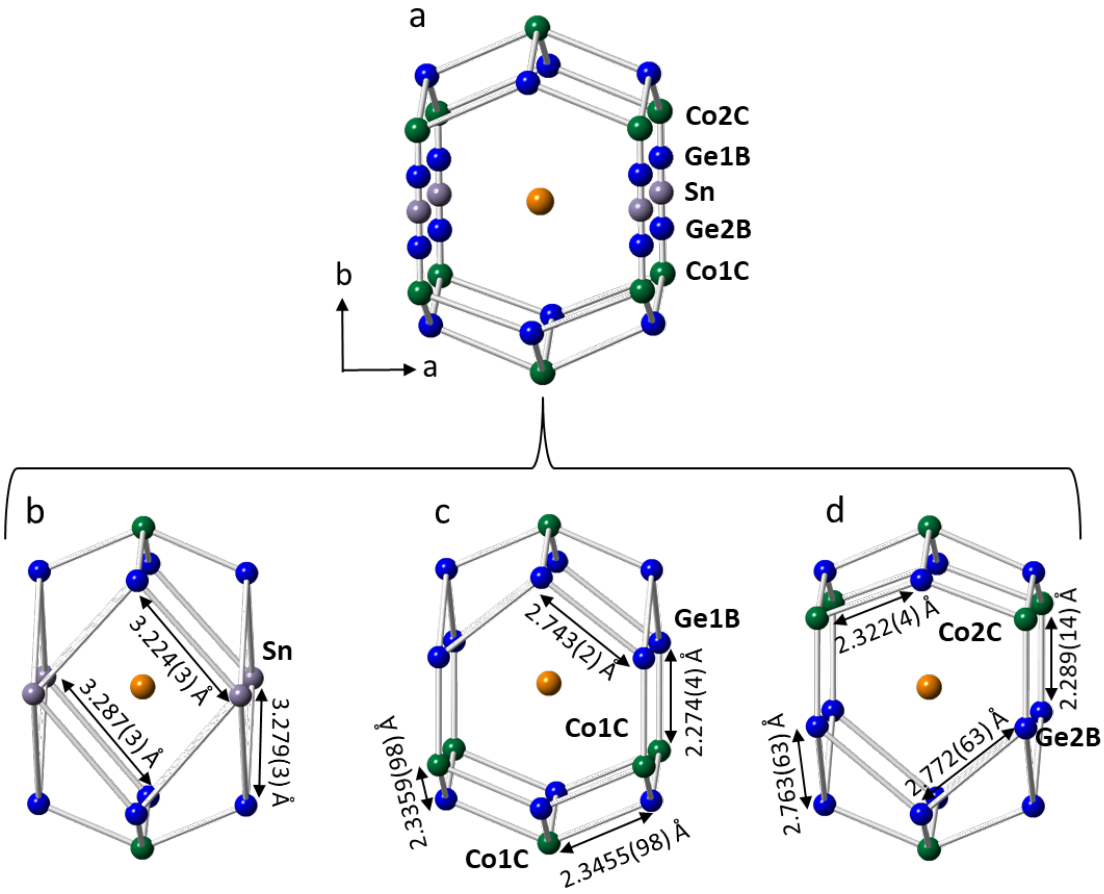

Figure S1. The Ce1 (orange sphere) cuboctahedron disorder model. **(a)** The Ce1 cuboctahedron with all surrounding atoms shown. Sn, Co, and Ge atoms **(**grey, green, and blue spheres, respectively) along the cuboctahedron edges are partially occupied. **(b)** Sn1A alone resides in 22% of unit cells. **(c)** Ge1B and Co1C are present in 65.5% of unit cells. **(d)** Ge2B and Co2C are present in 12.5% of unit cells.

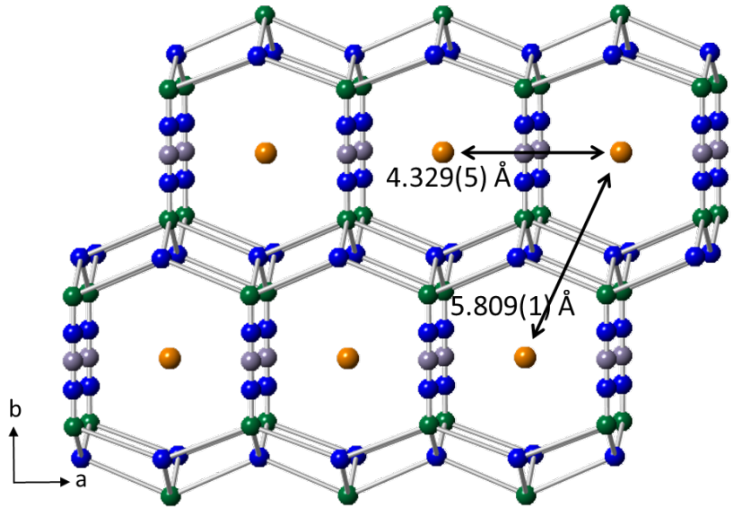

Figure S2. The Ce1 cuboctahedra face-share in all three crystallographic directions. Along the *b* direction, the Ce1 cuboctahedra stack in an ..*AB*.. arrangement which results in a staggered slab of Ce1 environments.

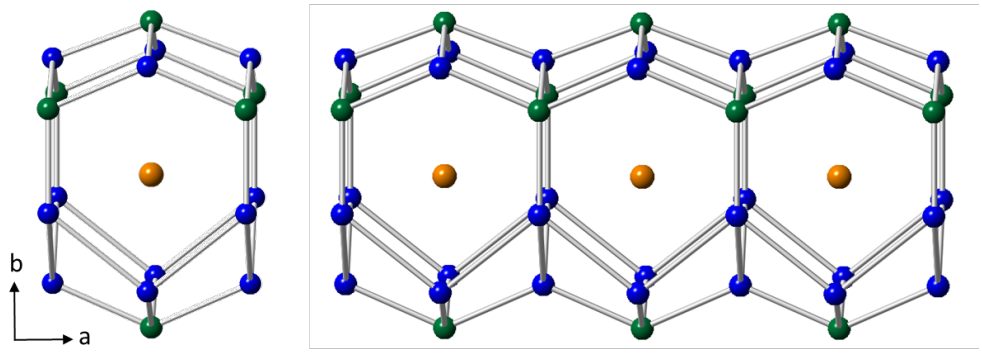

Figure S3. *Left.* The Ce2 atom resides in a polyhedron of six Co and twelve Ge atoms. *Right.* The Ce2 polyhedra face-share in the *a* and *b* directions forming a slab.

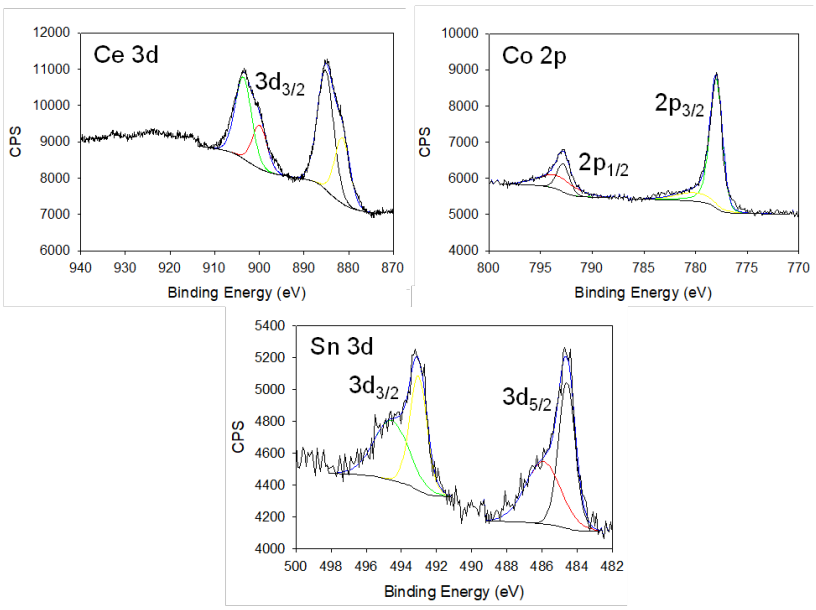

Figure S4. High resolution Ce 3d, Co 2p, and Sn 3d photoelectron spectra of a $Ce_6Co_5Ge_{16}$ single crystal. Also shown are the fits to the data using a Shirley background and Gaussian-Lorentzian peak shapes.