Supplementary Information for

Local chemical fluctuation mediated ultra-sluggish martensitic transformation in high-entropy intermetallics

Yuan Wu[1], Fei Zhang[1], Fengshou Li[1], Yi Yang[1], Jiaming Zhu[2], Hong-Hui Wu[1], Yao Zhang[1], Ruitao Qu[3], Zhefeng Zhang[3], Zhihua Nie[4], Yang Ren[5], Yandong Wang[1], Xiongjun Liu[1], Hui Wang[1], Zhaoping Lu[1,]*

[1] *Beijing Advanced Innovation Center for Materials Genome Engineering, State Key Laboratory for Advanced Metals and Materials, University of Science and Technology Beijing, Beijing 100083, China*

[2]*School of Civil Engineering, Shandong University, Jinan 250012, China*

[3] *Laboratory of Fatigue and Fracture for Materials, Institute of Metal Research, Chinese Academy of Sciences, Shenyang 110016, PR China*

[4]*School of materials science and engineering, Beijing Institute of Technology, Beijing 100081, China*

[5]*Department of Physics, City University of Hong Kong, 83 Tat Chee Avenue, Kowloon, Hong Kong, China*

** Correspondence and requests for materials should be addressed to Z. P. Lu (Email: luzp@ustb.edu.cn)*

Supplementary material including: Figures S1 to S6

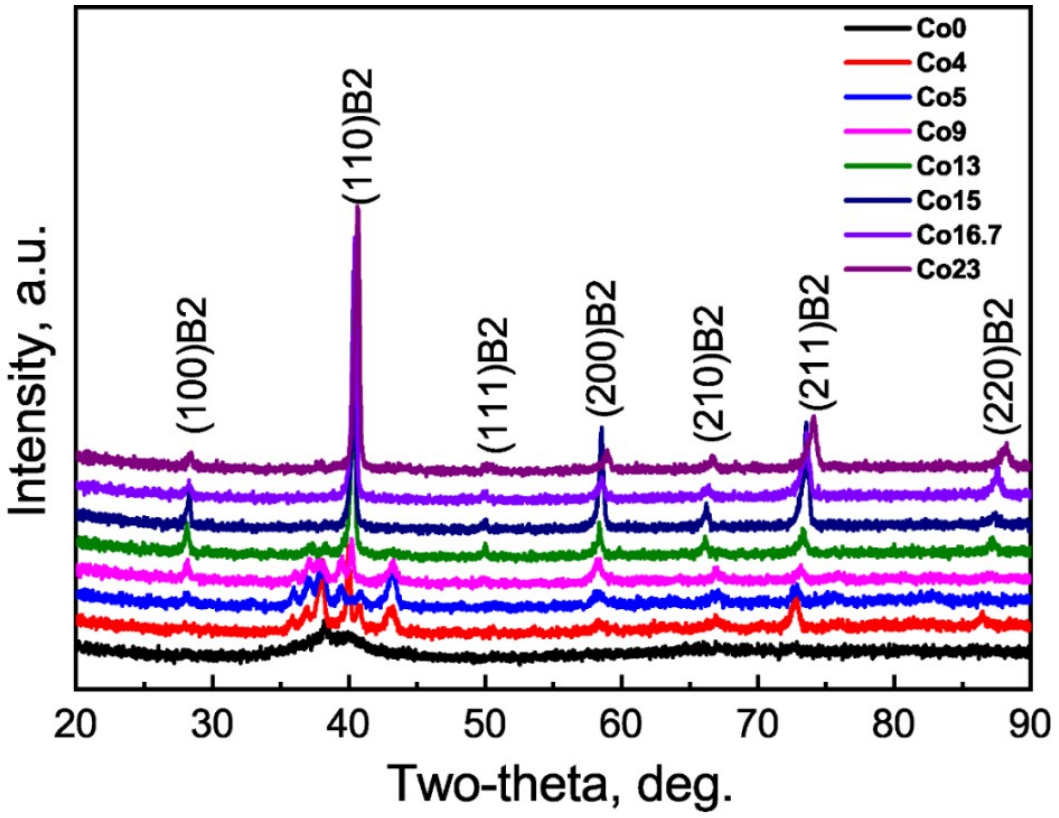

Figure S1 X-ray diffraction pattern of $(TiZrHfCuNi)_{100-x}Co_x$ alloys (a), alloys with x>15 show different peaks of a single B2 structure.

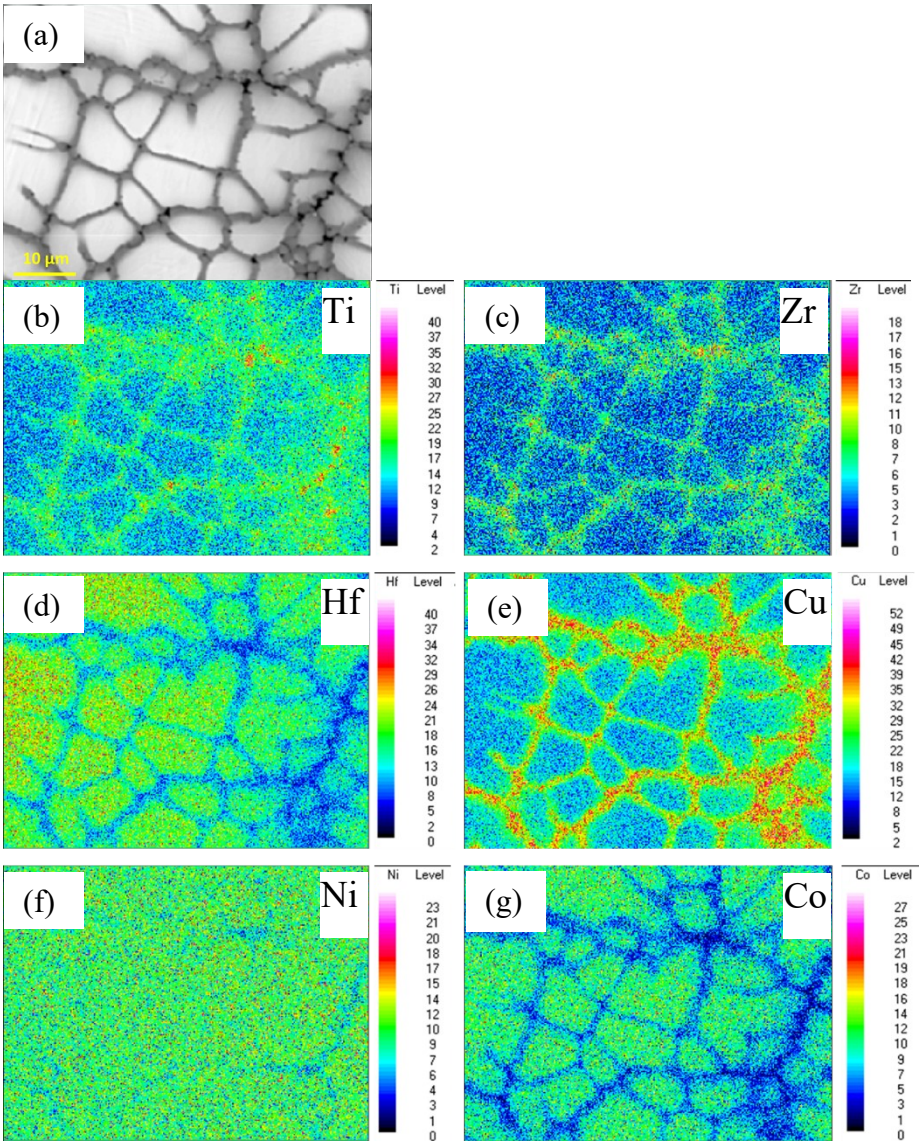

Figure S2 SEM image of the as-cast Co16.7 HEI, shows a single phase with a grain size of around 10 µm, and neither secondary phase or precipitation was found. The corresponding elemental mapping of Ti (b), Zr (c), Hf (d), Cu (e), Ni (f) and Co (g).

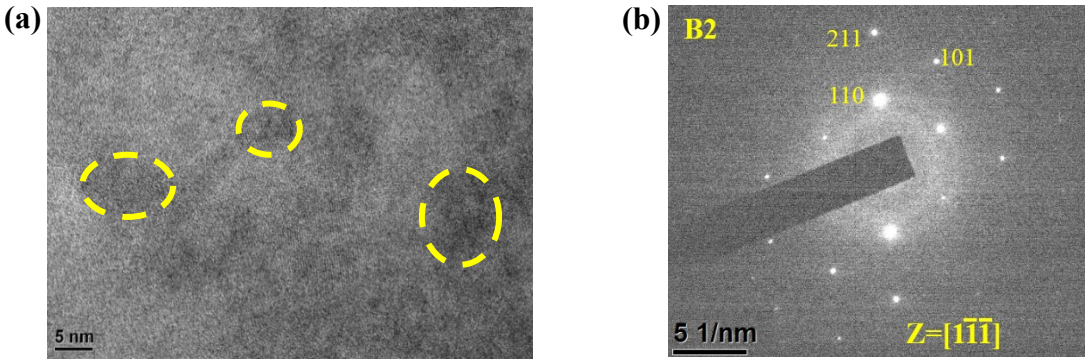

Figure S3 TEM image (a) and the corresponding selected area electron diffraction (SAED) pattern (b) of the $Co_{16.7}$ HEI. Single-phase with a B2 structure was confirmed while nano-scale chemical heterogeneity was also seen based on nano-scale contrast.

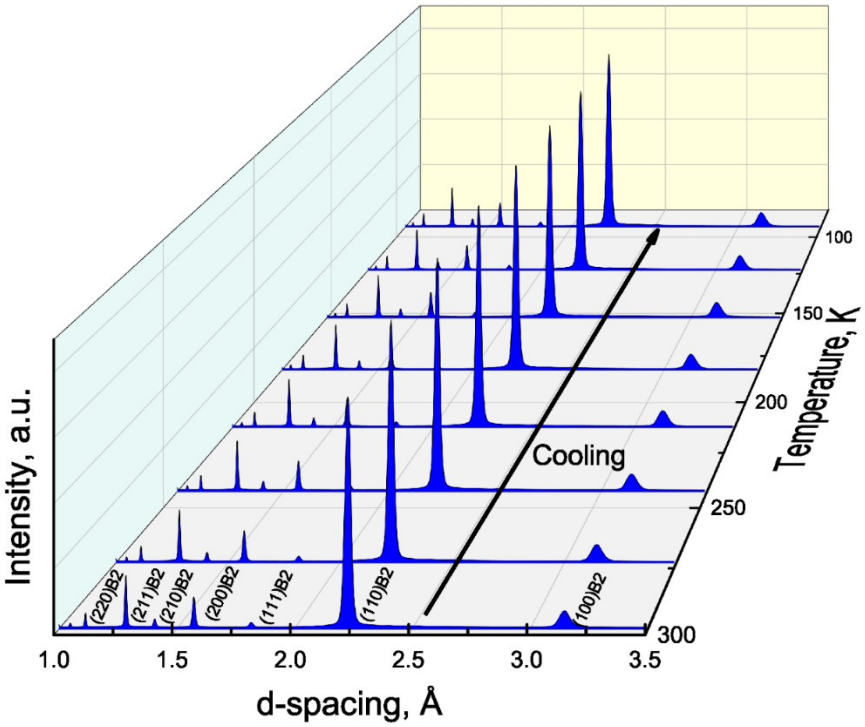

Figure S4 Evolution of the diffraction patterns during cooling from room temperature to 93 K. No change in the peak intensity was observed, indicating that the B2-phase keeps unchanged during the cooling process.

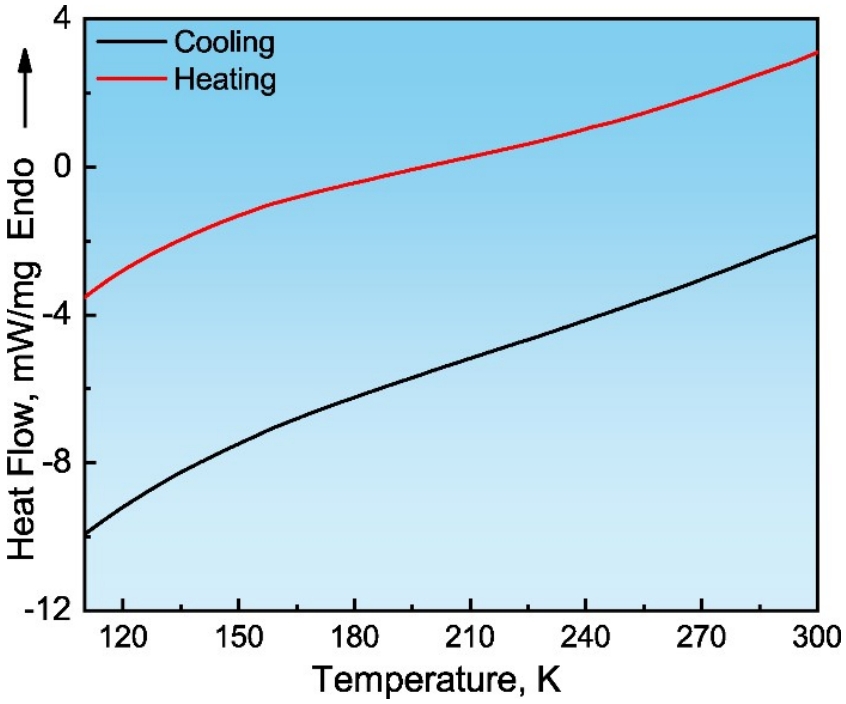

Figure S5 DSC heating and cooling curves of the Co16.7 HEI in the temperature range from 300 to 110 K.

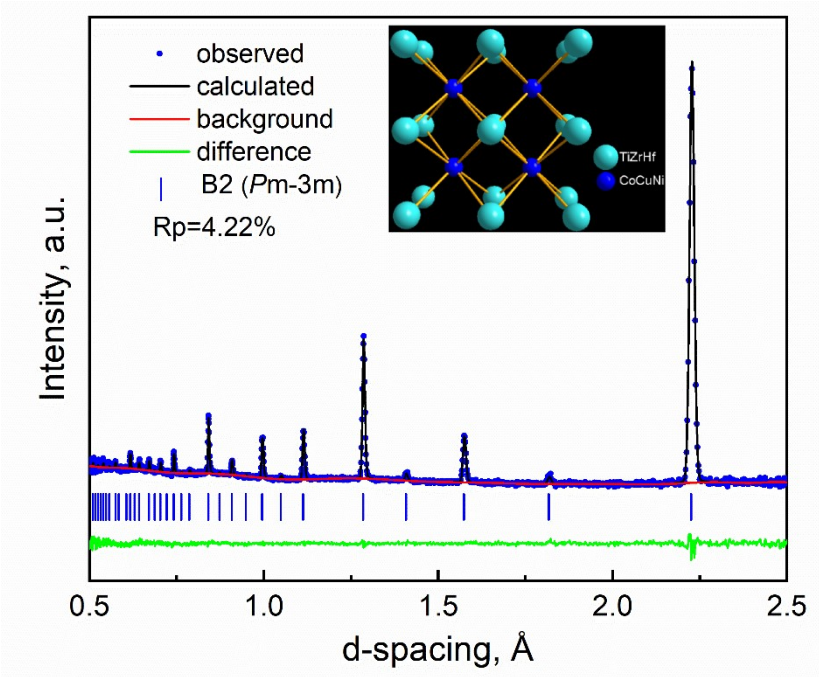

Figure S6 Rietveld refinement of the Co16.7 HEI from neutron diffraction at room temperature. The observed, calculated, background and difference patterns indicated by blue dots, green curve, red curve and deep green curve, respectively. The vertical blue lines shows the locations from the refined lattice parameters of B2. The R_p value confirms that the refinement result is reliable. The inset schematically illustrates a representative configuration of a high-entropy B2 lattice from the Rietveld refinement, Ti, Zr and Hf atoms occupy one sublattice while Co, Cu and Ni atoms locate at another sublattice.