Supporting Information -

Phonon scattering through a local anisotropic structural disorder in the thermoelectric solid solution Cu$_2$Zn$_{1-x}$Fe$_x$GeSe$_4$.

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Figure S 1: SEM micrographs of Cu$_2$Zn$_{1-x}$Fe$_x$GeSe$_4$ in backscattered (QBSD) and secondary electron mode (SE2), showing dense materials with similar microstructures and grain sizes between 10-20 µm.
Figure S 2: X-ray diffraction data including profile fit, profile difference, and profile residuals of the corresponding Rietveld fit of phase pure Cu$_2$ZnGeSe$_4$.

Figure S 3: X-ray diffraction data including profile fit, profile difference, and profile residuals of the corresponding Pawley fit of phase pure Cu$_2$Zn$_{1-x}$Fe$_x$GeSe$_4$. 
Figure S 4: X-ray diffraction data including profile fit, profile difference, and profile residuals of the corresponding Pawley fit of phase pure Cu$_2$Zn$_{1-x}$Fe$_x$GeSe$_4$. 

Cu$_2$Zn$_{0.8}$Fe$_{0.2}$GeSe$_4$ (R$_{wp}$=4.4)
Figure S 5: X-ray diffraction data including profile fit, profile difference, and profile residuals of the corresponding Pawley fit of phase pure Cu$_2$Zn$_{1-x}$Fe$_x$GeSe$_4$.

Figure S 6: X-ray diffraction data including profile fit, profile difference, and profile residuals of the corresponding Pawley fit of phase pure Cu$_2$Zn$_{1-x}$Fe$_x$GeSe$_4$. 
Figure S 7: X-ray diffraction data including profile fit, profile difference, and profile residuals of the corresponding Pawley fit of phase pure Cu$_2$Zn$_{1-x}$Fe$_x$GeSe$_4$. 

Cu$_2$Zn$_{0.5}$Fe$_{0.5}$GeSe$_4$ (R$_{wp}$=3.8)
Figure S 8: X-ray diffraction data including profile fit, profile difference, and profile residuals of the corresponding Pawley fit of phase pure Cu$_2$Zn$_{1-x}$Fe$_x$GeSe$_4$.

Figure S 9: X-ray diffraction data including profile fit, profile difference, and profile residuals of the corresponding Pawley fit of phase pure Cu$_2$Zn$_{1-x}$Fe$_x$GeSe$_4$.
Figure S 10: X-ray diffraction data including profile fit, profile difference, and profile residuals of phase pure Cu$_2$Zn$_{1-x}$Fe$_x$GeSe$_4$.

Figure S 11: X-ray diffraction data including profile fit, profile difference, and profile residuals of phase pure Cu$_2$Zn$_{1-x}$Fe$_x$GeSe$_4$. 
Figure S 12: X-ray diffraction data including profile fit, profile difference, and profile residuals of phase pure $\text{Cu}_2\text{Zn}_{1-x}\text{Fe}_x\text{GeSe}_4$. 

Cu$_2$FeGeSe$_4$ ($R_{wp}=5.7$)