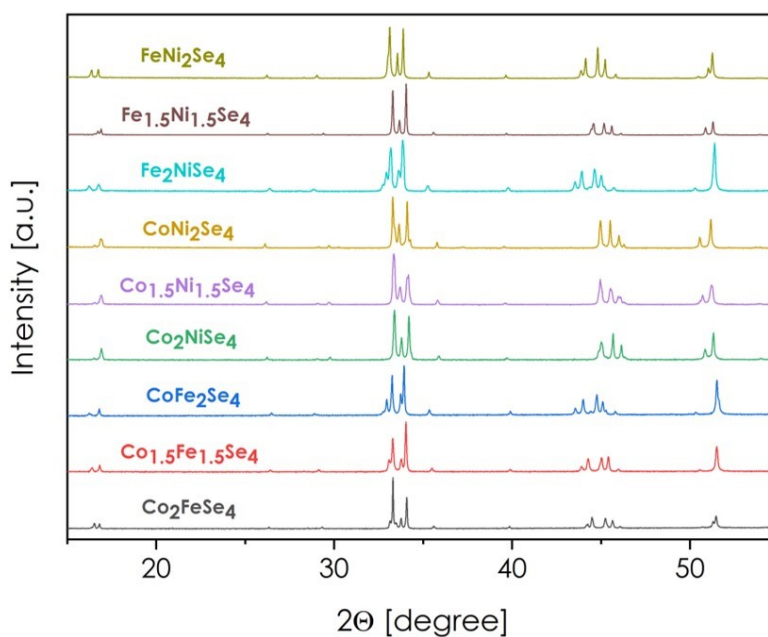
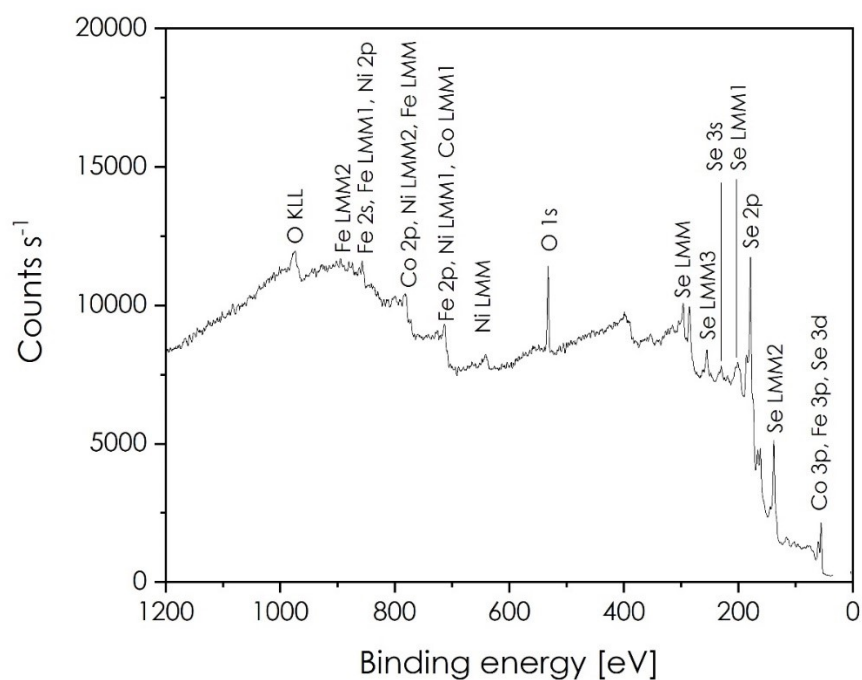


SI Table 1 Chemical composition of CoFeNiSe_4 powder and sintered pellet obtained from ICP-OES and XRF measurements (*XRF data consist also indicate a relatively high content of oxygen absorbed on the material's surfaces during milling and mixing with a binder. Residual amounts of Si, Al, Mg, Cl, and S were also recorded).

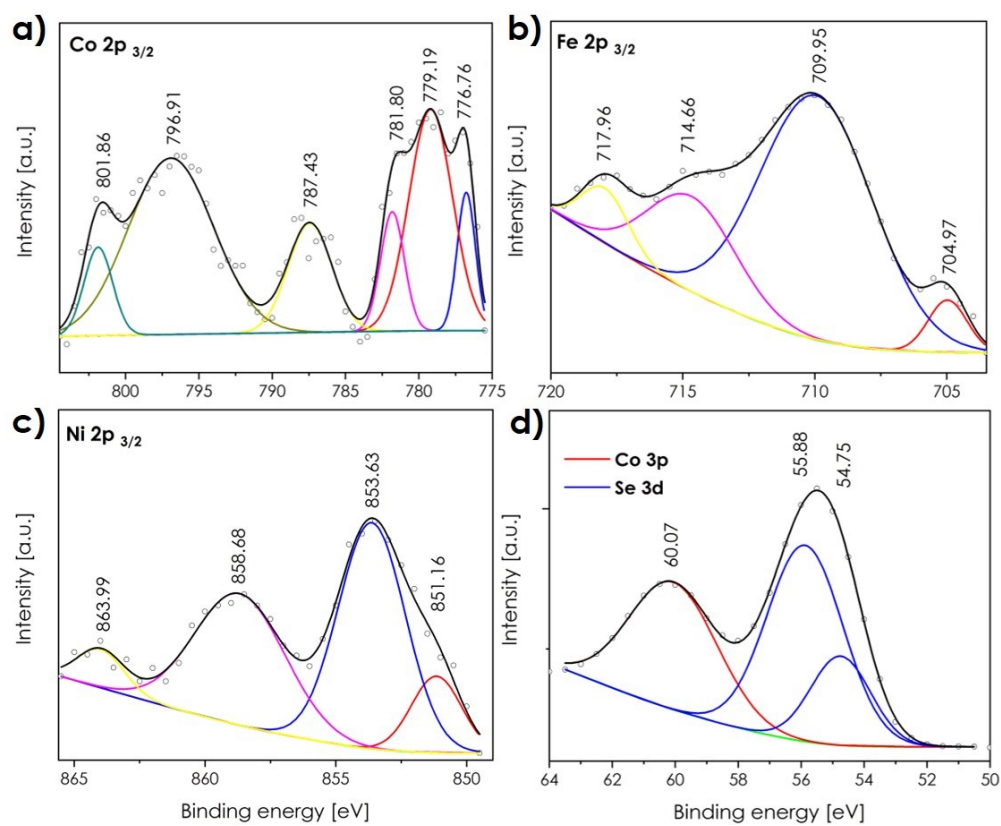
Method/Sample	Co	Fe	Ni	Se	Composition
	[mg/dm ³]	[mg/dm ³]	[mg/dm ³]	[mg/dm ³]	
ICP-EOS/powder	327.1	324.2	320.9	1813	$\text{Co}_{0.96}\text{FeNi}_{0.94}\text{Se}_{3.96}$
ICP-EOS/pellet	292.4	276.8	302.2	1630	$\text{CoFeNi}_{1.04}\text{Se}_{4.16}$
	%	%	%	%	
XRF/powder*	8.495	8.430	9.065	45.456	$\text{Co}_{0.96}\text{FeNi}_{1.02}\text{Se}_{3.82}$
XRF/pellet*	8.177	8.048	8.958	45.919	$\text{Co}_{0.96}\text{FeNi}_{1.06}\text{Se}_{4.04}$



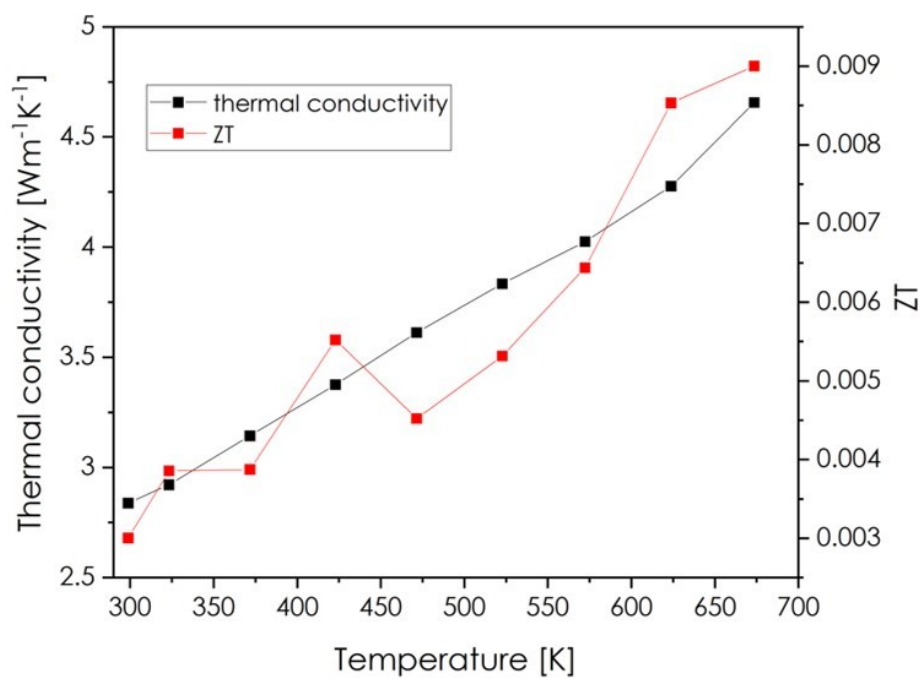
SI.Fig. 1 XRD patterns of ternary $(\text{Co,Fe,Ni})_3\text{Se}_4$ systems indicating single-phase $C2/m$ monoclinic structure (ref. 98-062-2978).



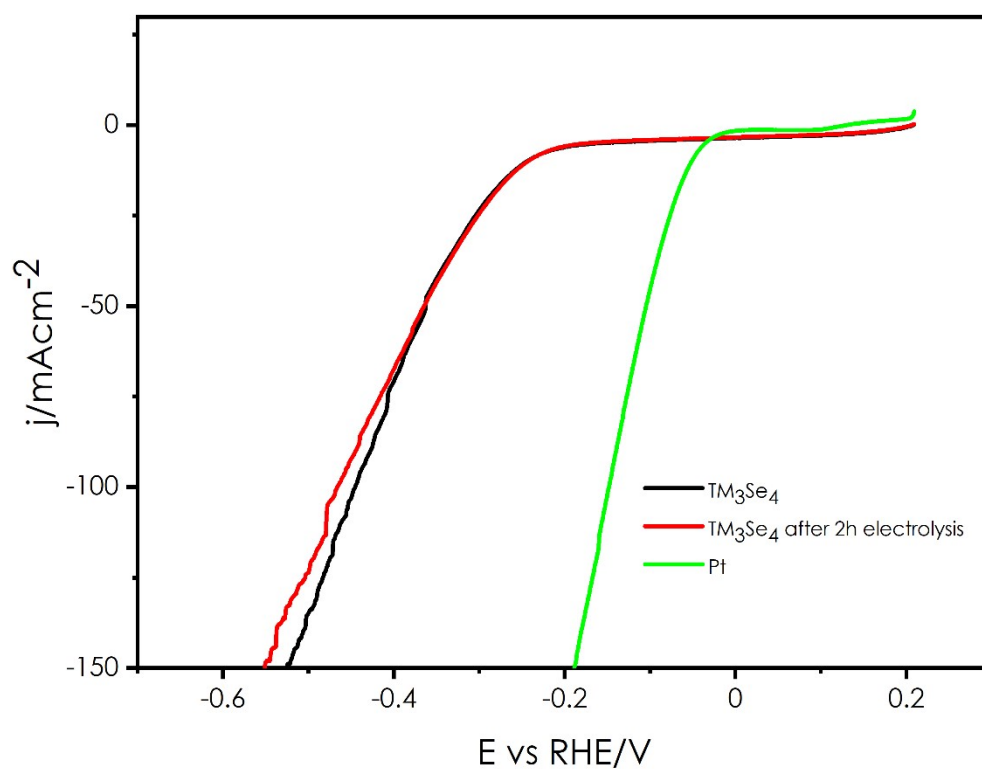
SI.Fig. 2 XPS survey spectrum of $(\text{Co,Fe,Ni})_3\text{Se}_4$ sample.



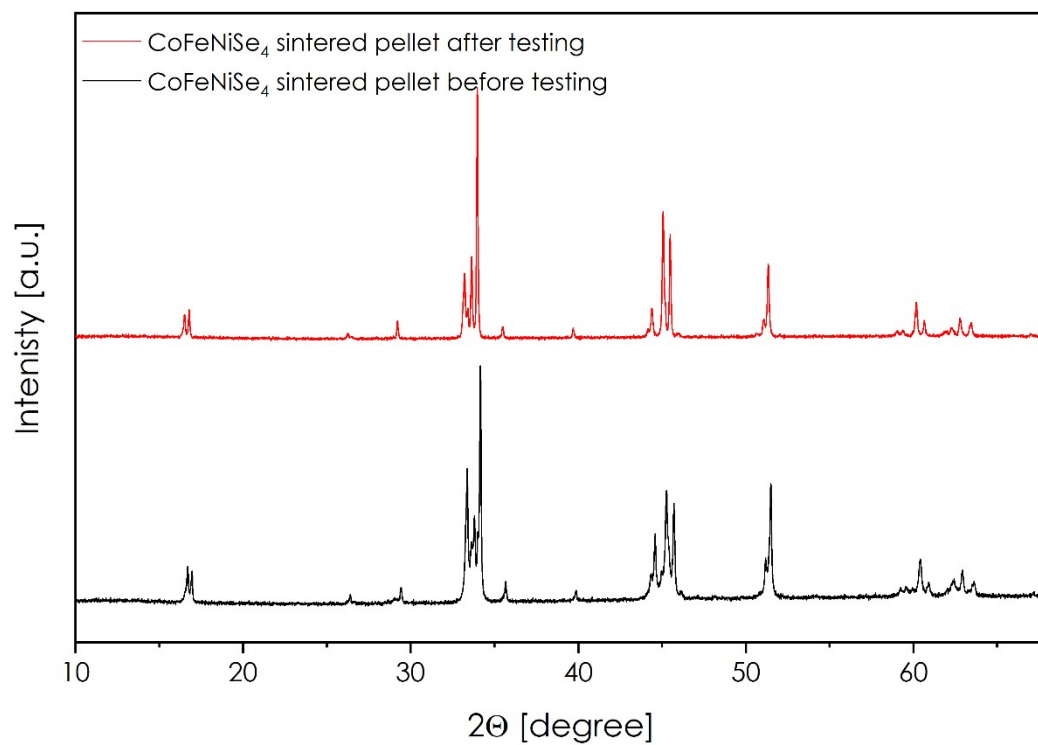
SI.Fig. 3 XPS data of $(\text{Co,Fe,Ni})_3\text{Se}_4$: a) Co 2p, b) Fe 2p, c) Ni 2p, d) combined Co 3p and Se 3d deconvoluted core level spectra.



SI.Fig. 4 Total thermal conductivity and thermoelectric figure-of-merit as a function of temperature for $(\text{Co,Fe,Ni})_3\text{Se}_4$ sample.



SI.Fig. 5 LSV curves normalized to geometric area recorded at sweep rate 6.25 mVs^{-1} at $0.5 \text{ M H}_2\text{SO}_4$



SI.Fig. 6 XRD patterns for CoFeNiSe_4 sintered sample before (bottom) and after (top) electrochemical testing.