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

Thermal stability and enhanced thermoelectric properties of the tetragonal tungsten bronzes $Nb_{8-x}W_{9+x}O_{47}$ ($0 < x < 5$)

G. Cerretti,[a] M. Schrade,[b] X. Song,[b] B. Balke,[a] H. Lu,[c] T. Weidner,[c] I. Lieberwirth,[c] M. Panthöfer,[a] T. Norby[b] and W.Tremel*[a]

[a] *Institut für Anorganische Chemie und Analytische Chemie der Johannes Gutenberg-Universität, Duesbergweg 10-14, D-55099 Mainz, Germany.*
[b] *Centre for Materials Science and Nanotechnology, University of Oslo, FERMiO, Gaustadalle´en 21, NO-0349 Oslo, Norway.*
[c] *Max Planck Institut für Polymerforschung, Ackermannweg 10, D-55128 Mainz, Germany.*

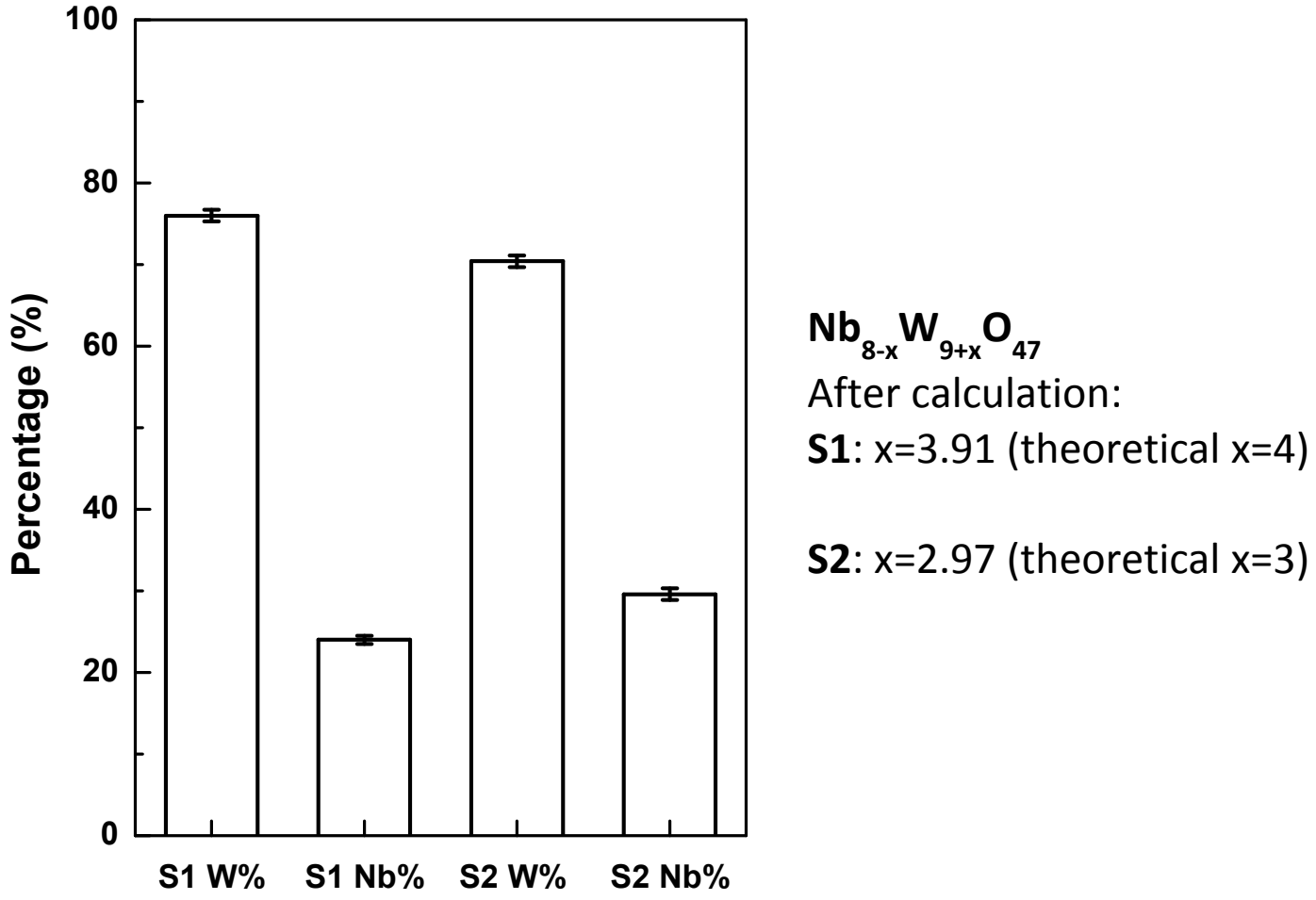


Fig. S1. Percentage atomic composition of W and Nb calculated by quantifying the peak intensities of W 4d and N 3d core-level emissions measured with XPS technique. The obtained results confirmed the expected substitution level and therefore the high quality of the synthesized compounds.

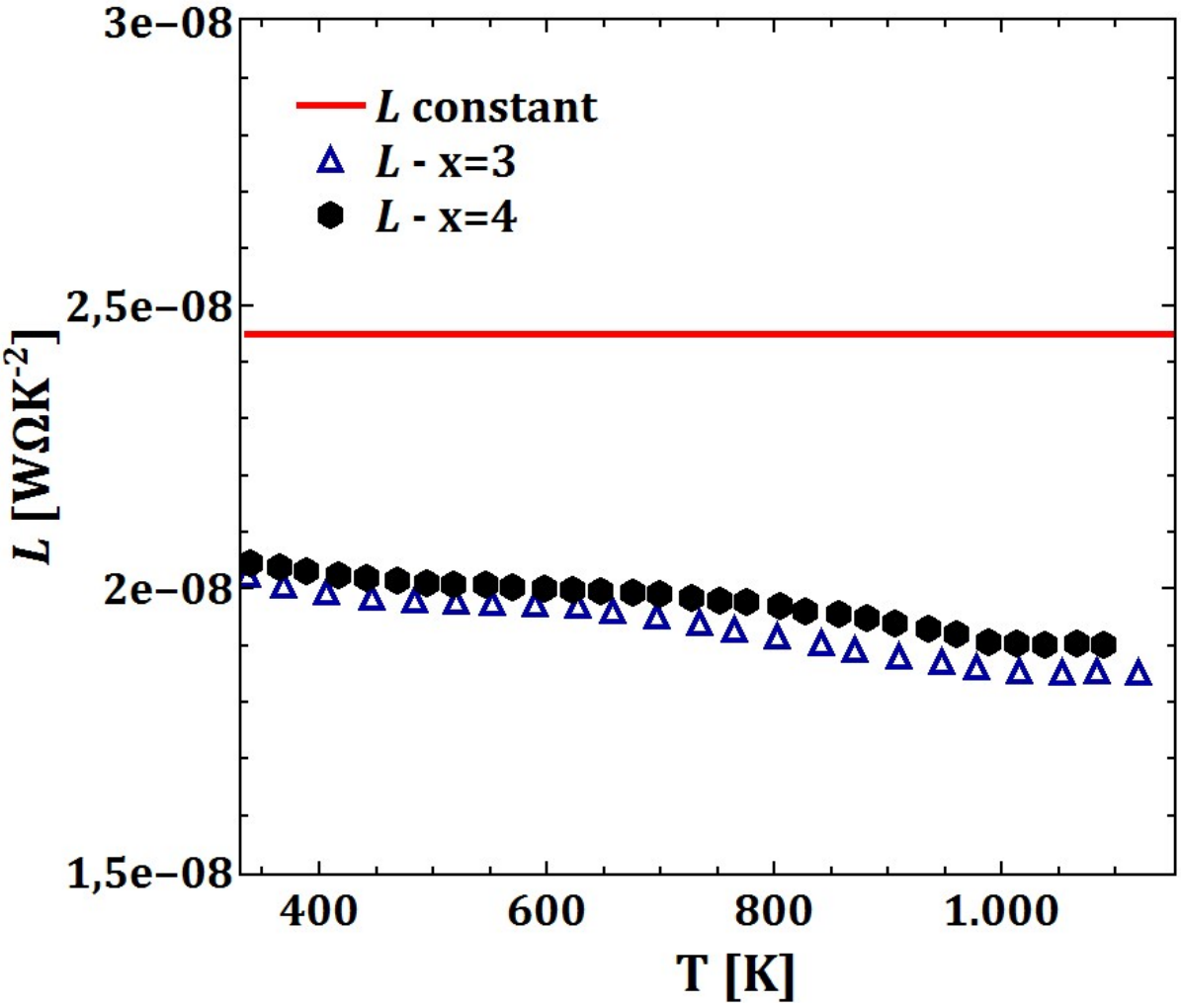


Fig. S2. Comparison between the thermopower dependent Lorenz numbers calculated with the formula derived by Kim et al. *APL Mater.* 3, 2015 (points) and the value of the degenerate limit 2.44×10^{-8} $W\Omega K^{-2}$ (red solid line).

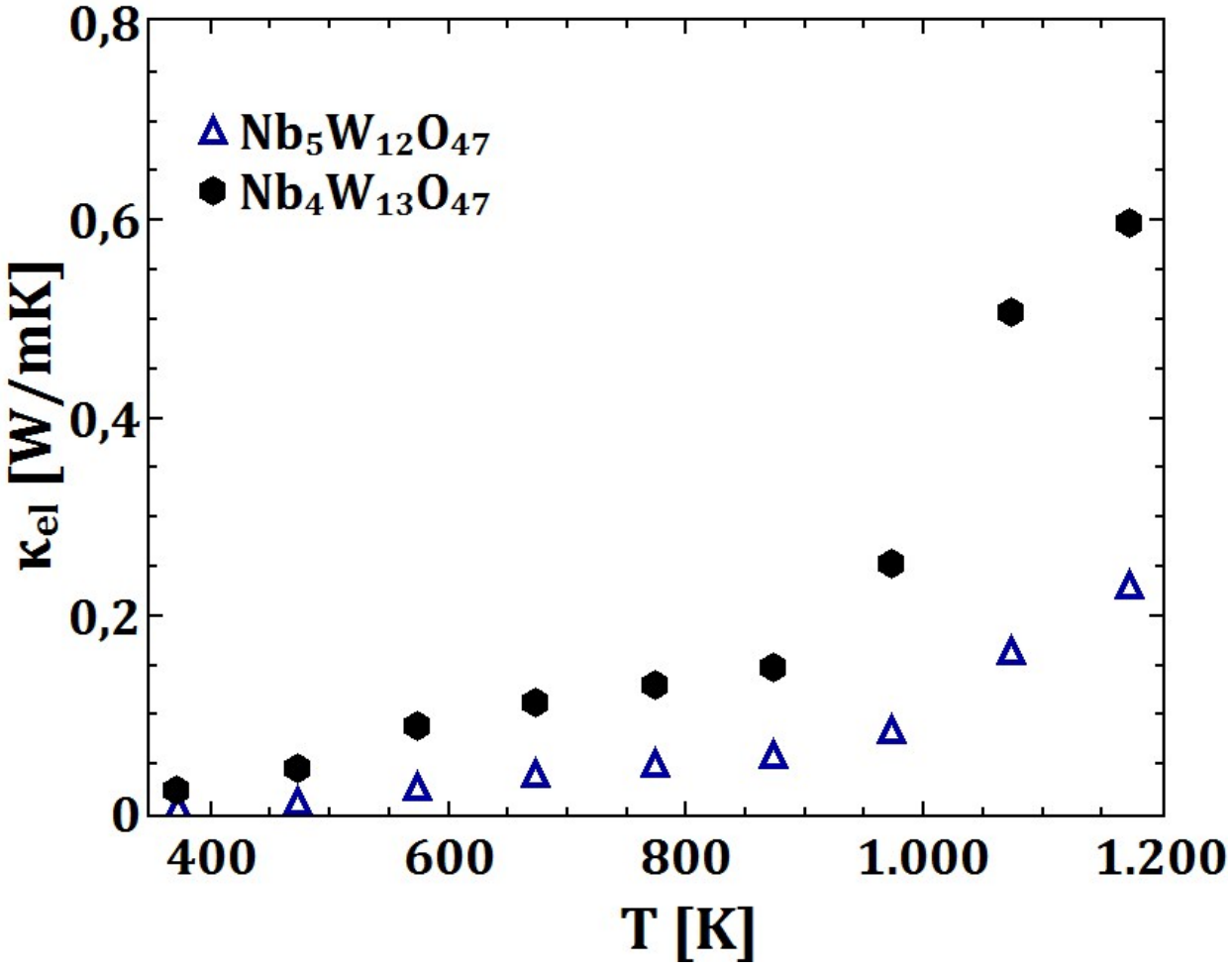
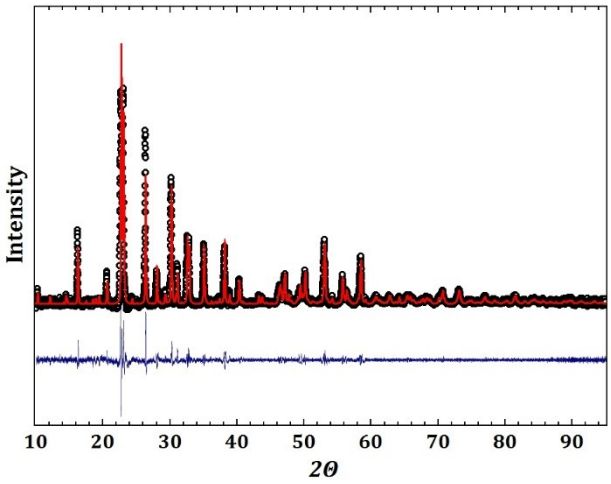


Fig. S3. Comparison of κ_{el} values as a function of temperature for the sample $Nb_5W_{12}O_{47}$ (x = 3) and $Nb_4W_{13}O_{47}$ (x = 4). The evaluation of κ_{el} has been done using the thermopower dependent values of the Lorenz's number.


Intensity
10
20
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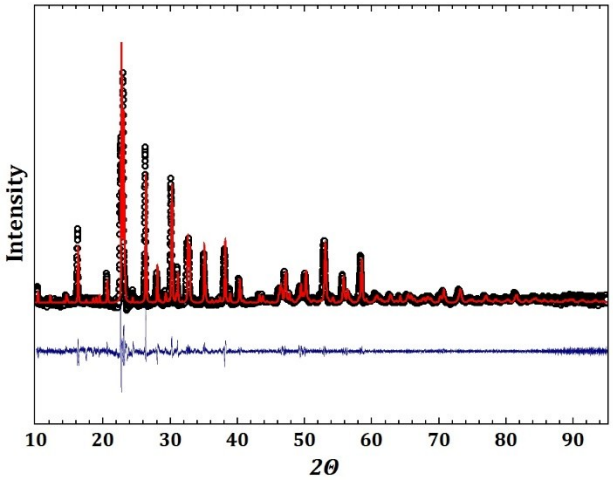
40
50
60
70
80
90
2Θ


Intensity
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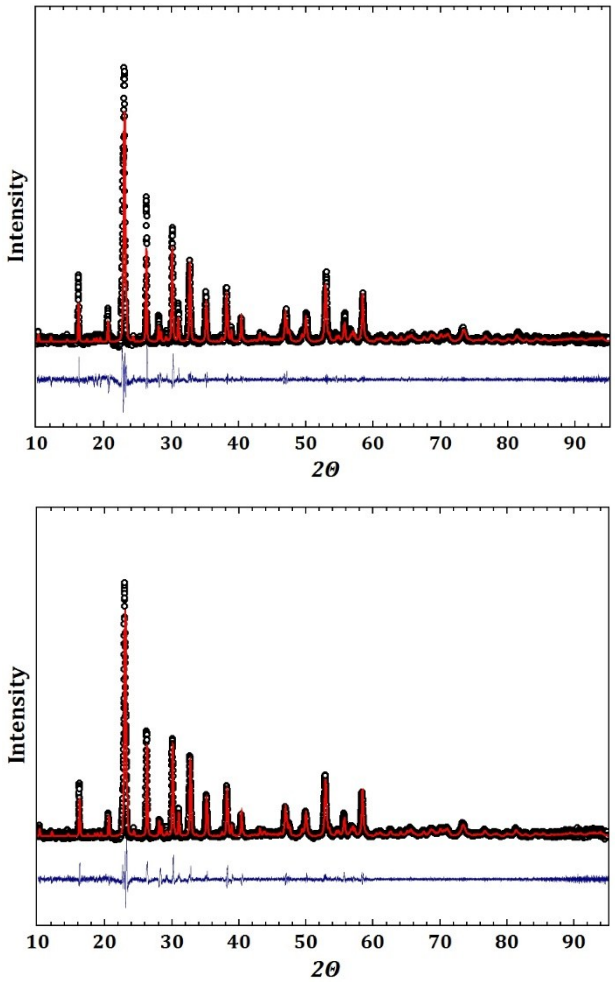

Fig. S4. X-ray diffractograms of $Nb_5W_{12}O_{47}$ before (top left) and after (top right) and of $Nb_4W_{13}O_{47}$ before (bottom left) and after (bottom right) thermal cycling. Experimental (black circles), theoretical profile (red line) and difference between the diffraction patterns (blue line). The compositions and structures of both samples after cycling remained unchanged, confirming their stability.