





---

# Pt<sub>2</sub>AuCuNiSn, a new noble metal single-phase high entropy alloy

B. Winkler <sup>a</sup>, E.A. Juarez-Arellano <sup>a b</sup>  , W. Morgenroth <sup>a</sup>, A. Barkov <sup>c</sup>, A.-C. Dippel <sup>d</sup>, M.v. Zimmermann <sup>d</sup>, O. Ivashko <sup>d</sup>, O. Gutowski <sup>d</sup>

Show more 

 Share  Cite

---

<https://doi.org/10.1016/j.jssc.2020.121837> 

[Get rights and content](#) 

---

## Abstract

A new single-phase noble metal high entropy alloy, Pt<sub>2</sub>AuCuNiSn, has been obtained at comparatively low temperatures by a solid-state reaction. A Rietveld refinement gave a satisfactory description of the X-ray diffraction data, showing that the compound crystallizes with space group *Fm $\bar{3}$ m*, where only one Wyckoff site is occupied. In bulk samples, SEM/EDX measurements gave no indication for chemical inhomogeneities on a  $\mu\text{m}$  length scale. Temperature dependent in situ diffraction measurements using high energy ( $\lambda=0.1204\text{\AA}$ ) radiation up to 875K show several transient phases upon heating a mixture of the elements, consistent with results of DSC measurements. The parameter describing the variability of the radii of the constituent atoms,  $\delta r$ , is uncommonly large ( $\delta r=8.7\%$ ) and maybe the origin of the instability of this alloy at high temperatures.

## Graphical abstract