

Crystal structure and magnetic properties of $\text{EuNi}_{6.9}\text{Si}_{6.1}$

N. Klymentiy,¹ S. Pukas,¹ B. Belan,¹ R. Gladyshevskii,¹ and
D. Kaczorowski²

¹*Department of Inorganic Chemistry,
Ivan Franko National University of Lviv,
Kyryla i Mefodiya St. 6, 79005 Lviv, Ukraine*

²*Institute of Low Temperature and Structure Research,
Polish Academy of Sciences, P.O. Box 1410, 50-950 Wrocław, Poland*

The existence of the europium nickel silicide $\text{EuNi}_{7.8-6.7}\text{Si}_{5.2-6.3}$ [O.I. Bodak, E.I. Gladyshevskii, *Dopov. Akad. Nauk Ukr. RSR, Ser. A* (1969) 1125] was confirmed. Its crystal structure was refined by the Rietveld method, using the X-ray pattern of a single-phase alloy of composition $\text{EuNi}_{6.9}\text{Si}_{6.1}$. The structure is tetragonal ($a = 7.8491(9)$, $c = 11.279(1)$ Å), and the structure type $\text{CeNi}_{8.5}\text{Si}_{4.5}$ ($I4/mcm$), which is one of the tetragonal derivatives of the cubic type NaZn_{13} , was chosen as starting model for the refinement. Differently from $\text{CeNi}_{8.5}\text{Si}_{4.5}$, in $\text{EuNi}_{6.9}\text{Si}_{6.1}$ the Ni and Si atoms were found to form statistical mixtures in all of the positions not occupied by Eu. The results of the investigation of the magnetic properties indicated Curie-Weiss paramagnetism due to stable magnetic moments on divalent europium ions. The inverse magnetic susceptibility follows the Curie-Weiss law with an effective magnetic moment of $\mu_{eff} = 7.66 \mu_B$ and a paramagnetic Curie temperature of $\theta_p = -9.5$ K.