# Intermetallic compounds containing f-elements: synthesis of some of the compounds from the system $R_2TGe_6$ (R=Dy, Er; T=Ni, Cu, Pd)

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Low-dimensional magnetic crystals display highly anisotropic interactions between the magnetic moments, yielding interesting magnetic [1], electronic [2], and optical properties [3]. The ground and excited states of low-dimensional magnetic systems attract interest with increasing spin dimension andor decreasing spin values [4]. Materials containing isolated chains might work as models for (1D) S=1/2 Heisenberg systems and Ising spin chains. These models can be used for shedding light on the understanding of magnetic exchange interaction in highly correlated systems. When a geometrical distribution of the magnetic moments is such that it constrains the exchange interactions, the interaction energy is difficult to be minimized, causing the appearance of a complex electronic structure. This often leads to magnetic frustrations. Magnetic frustrations have an impact beyond magnetism, such as multiferroic and high-temperature conductivity behaviors [5,6]. Intermetallic systems are prone to have magnetic frustration, having a high potential for finding new electronic phenomena [7]. The system $R_2TGe_6$ often displays complex modulated magnetic structures, which can be elucidated by neutron scattering, while the nuclear structure is solved by X-rays or electron diffraction. The accurate structure elucidation of complex magnetic structures is crucial for understanding these structures. Currently, the sole program that handles complex magnetic structures and can combine X-ray, electron, and neutron diffraction is Jana2006 [8]. New features for the analysis of complex magnetic structures are being developed and require neutron diffraction data of such structures. We synthesized some of the compounds from the $R_2TGe_6$ system, aiming at acquiring neutron diffraction data for testing and further developing the new tools for magnetic structures in Jana2006.

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